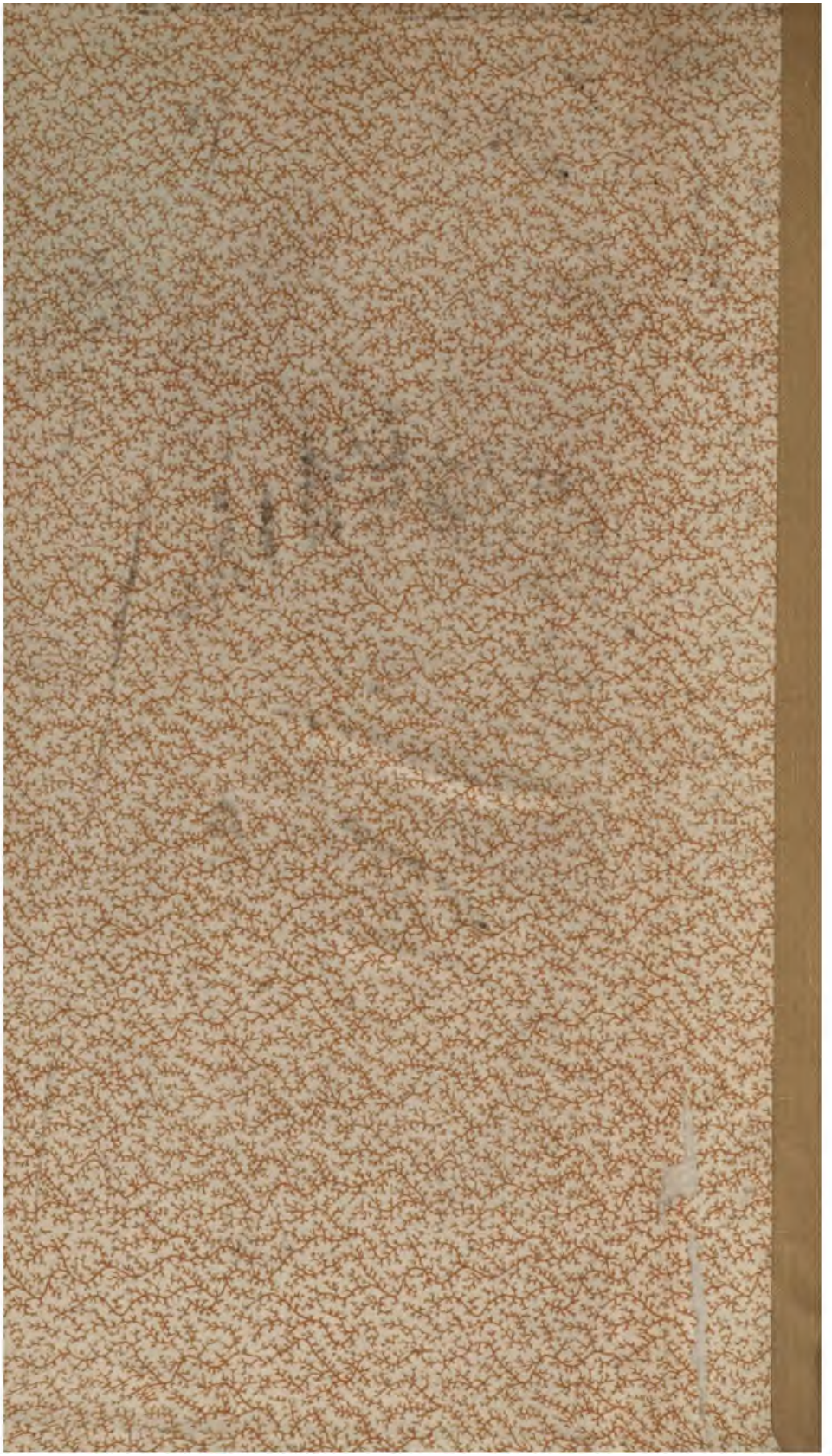

HINRICHS: AMANA METEORITES

As we find it impossible to go to them, they come to us, true messengers from on high.

DAUBRÉE.

Editor Scientific Am. Supplement
with the compliments
of the author

AMANA METEORITES.

HINRICHS.

Agréé, Cher et Honoré Maître, l'assurance de
ma cordiale estime très distinguée et bien sincères sentiments dévoués
Daubrée

THE

AMANA METEORITES

OF

FEBRUARY 12, 1875.

BY

GUSTAVUS DETLEF HINRICHS, M. D., LL.D.,

Honorary and Corresponding Member of Scientific Societies in Austria, England, France, Germany and the United States;
Professor of Chemistry in the Medical Department,
St. Louis University.

WITH 16 PLATES.

ST. LOUIS, MO., U. S.

CARL GUSTAV HINRICHS, PUBLISHER.

New York and Leipzig, LEMCKE AND BUECHNER.

London, H. GREVEL & CO. Paris, H. LE SOUDIER.

1905.

HINRICHS' FIRST COLLECTION OF AMANA METEORITES.

PRESENTED TO:

1. PARIS, 1ST.
2. LONDON.
3. HINRICHS
4. VIENNA.
5. COPENHAGEN
6. BERLIN.
7. CHRISTIANIA
8. STOCKHOLM.
9. LAUSANNE.

HINRICHS' SECOND COLLECTION OF AMANA METEORITES.

PRESENTED TO:

11. ST. PETERSBURG.
13. BRUSSELS. 16. MUNICH. 14. HARLEM (NOW AT BUDAPEST).
17. IRISH, C. W. 15. PARIS, 2ND. 10. IRISH, J. P. 12. HINRICHS. 18. HINRICHS.

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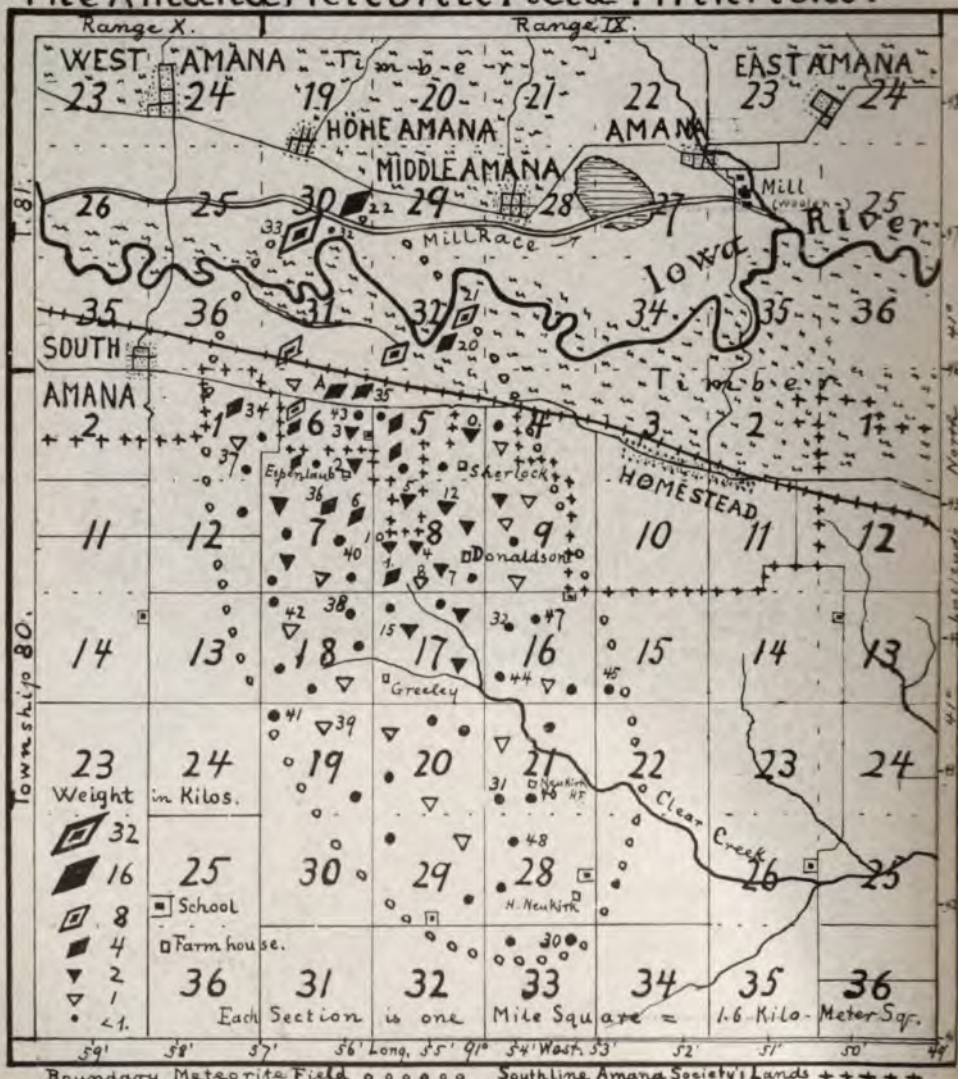
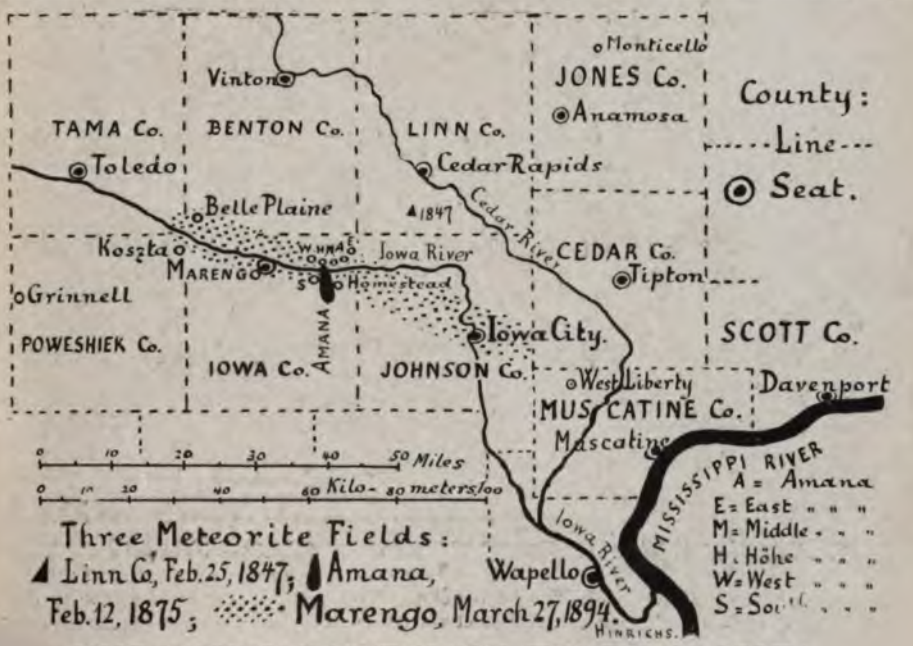
The Amana Meteorite Field. Hinrichs.



Boundary Meteorite Field ○○○○○○ Southline Amana Society's Lands +++++
- - - - Section Lines ——— Roads. +++++++ C.R.& P. Railroad.

Location of numbered Meteorites has been determined by Author.
All Meteorites here entered are contained in the six Collections of the Author.

THE GREAT IOWA METEOR OF FEBRUARY 12, 1875.



THE THREE METEORITE FIELDS OF IOWA.

Königliche Akademie der Wissenschaften

Berlin den 6ten Juli 1875

Hochgeehrter Herr Professor!

Ich habe die angenehme Pflicht, im Auftrage der Königlichen Akademie der Wissenschaften Ihnen deren wärmsten Dank für das außerordentliche Interesse, den seltenen Kunstfleiß, und die rühmende Uneigennützigkeit auszusprechen, mit welche Sie es sich haben angelegen sein lassen, Ihrer effectvollen Darstellungen mit einer so werthvollen Serie des großen Meteorfalls von Iowa County zu bereichern. Die Herren Beyrich, Roth und Websky, zwischen denen gegenwärtig die Verwaltung des mineralogischen Museums getheilt ist, Herr Dove, Herr Ewald und Herr Rammelsberg, die sich in der Akademie vorzüglich für Meteoriten interessiren, haben ganz besonders Freude über Ihr Geschenk an den Tag gelegt, und es ist mir allgemein bedauert worden, daß Gustav Rose, der für die Meteoriten die gleichmäßige Begeisterung bis zu seinem Tode bewahrte, nicht mehr da war, um diese Freude zu theilen.

Mit der vorzüglichsten Hochachtung

Ihr ergebenster

i. V. beständiger Secretar
der Königlichen Akademie der Wissenschaften
Ecke Bois Reymond

An
Herrn Professor Dr J. Hinrichs

Iowa-City

MINISTERE
DE L'INSTRUCTION
PUBLIQUE
DES CULTES
Et des Beaux-Arts.

DIRECTION
de
l'Enseignement Supérieur.
1er Bureau
Toutes les Lettres et Réponses doivent être adressées directement au Ministre
Réponse à dépêche
en date du
objet.
Muséum d'histoire naturelle.
Don d'une météorite.

Paris, le 7 Juillet 1875

Monsieur,

Je vous informe que vous avez bien voulu faire don au Muséum d'histoire naturelle d'une belle météorite tombée, le 12 février dernier, sur le territoire de Iowa.

L'administration du Muséum se félicite d'avoir reçu ce précieux témoignage de générosité et de sympathie. Je suis heureux de me faire auprès de vous, Monsieur, l'interprète de ses sentiments de vive reconnaissance.

Agréez, Monsieur, l'assurance de ma considération la plus distinguée.

Le Ministre de l'Instruction publique, des Cultes et des Beaux-Arts,

A. Wallon

A M. Hinrichs, professeur à l'Université de Iowa
(Etats-Unis)

Königliche Akademie der Wissenschaften. Berlin den 6ten Juli 1875

Hochgeehrter Herr Professor!

Ich habe die angenehme Pflicht, im Auftrage der Königlichen Akademie der Wissenschaften Ihnen deren wärmsten Dank für das ausgezeichnete Zuvorkommen, den seltenen Diensteifer, und die aufopfernde Uneigennützigkeit auszusprechen, mit welcher Sie es sich haben angelegen sein lassen, unsere öffentlichen Sammlungen mit einer so werthvollen Probe des grossen Meteorfalls von Iowa County zu bereichern. Die Herren Beyrich, Roth und Websky, zwischen denen gegenwärtig die Verwaltung des mineralogischen Museums getheilt ist, Herr Dove, Herr Ewald und Herr Rammelsberg, die sich in der Akademie vorzüglich für Meteoriten interessiren, haben ganz besondere Freude über Ihr Geschenk zu den Tag gelegt, und es ist mir allgemein bedauert worden, dass Gustav Rose, der für die Meteoriten die glücklichste Begeisterung bis zu seinem Tode bewahrte, nicht mehr da war, um diese Freude zu theilen.

Mit der vorzüglichsten Hochachtung

Ihr ergebenster

d. Z. verstehender Sekretar
der Königlichen Akademie der Wissenschaften
Ecke Berg Peymond

Sr.
Herrn Professor Dr J. Kirkwood

Iowa-City

MINISTERE
DE L'INSTRUCTION
PUBLIQUE
DES CULTES
Et des Beaux-Arts.

DIRECTION
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Agréez, Monsieur, l'assurance de ma considération la plus distinguée.

Le Ministre de l'Instruction publique, des Cultes et des Beaux-Arts,

A. M. Hinrichs, professeur à l'Université de Iowa
(Etats-Unis)

Exemplar zu opfern kann nicht
genug anerkannt werden. Von
den grossen Stücken zu 33 u.
21 Kilo habe ich schon durch
Smith gehört. Ich möchte gerne
ein solches grosses Exemplar erwer-
ben wenn es um eine vernünftige
Summe zu haben wäre, doch
könnte ich den Antrag Smith's
ein gleiches Gewicht verschiedener
Meteoriten aus der Wiener Samm-
lung dafür im Tausche zu geben,
nicht acceptiren. Ich müsste
sonst unsere schöne Sammlung
arg beschädigen.

Mit dem Ausdrucke vorzüglicher
Hochachtung

Ihr ergebenster

G. Tschermak

STATE OF IOWA, } ss.
Johnson County.

Henry Maas
vs.
The Amana Society et al

In the District Court,
For Johnson County, Iowa,
At January Term, A. D. 1877

ORIGINAL NOTICE

To The Amana Society et al Gustavus Henricks
Defendants

You are hereby notified, that on or before the 15 day of September 1876, a petition will be filed by said plaintiff Henry Maas in the office of the Clerk of the District Court of said Johnson County, Iowa, claiming ~~of you~~ judgment against you for the delivery of a certain meteor stone, of black color, weighing about 75 lbs or for the value thereof if the same cannot be found and for $ 50 cts damages

And that unless you appear thereto and defend before noon of the second day of the next Term of the said Court, commencing at Iowa City the first day of January 1877, default will be entered against you and judgment rendered thereon.

Dated this 4 day of September A. D. 1876.

Isaiah Bonovint Rouck
Attorney for Plaintiff

Museum mineralogic. Academiae scient. Imper. Petrop.

Amana.
(Iowa County, Iowa, U. St. A.)
Syn: Iowa City, Homestead, Marengo,
Sherloe, West Liberty etc. – 12/II 1875

Вѣсъ 3260 граммовъ.

Подарокъ проф. Gust. Hinrichs'a въ 1875 г.

Museum mineralogic. Academiae scient. Imper. Petrop.

Amana
(Iowa County, Iowa, U. St. A.)
Syn: Iowa City, Homestead, Marengo,
Sherloe, West Liberty etc. – 12/II 1875

Weight 3260 gr. (Formerly 3268)

Present of Prof Dr Gust. Hinrichs.

Comptes Rendus, T. 81, p. 1025; 1875

M. Daubrée, en présentant à l'Académie un nouvel échantillon de météorite de l'État d'Iowa, s'exprime comme il suit :

« M. le professeur Hinrichs, de l'Université d'Iowa City (États-Unis), qui a déjà bien voulu offrir au Muséum d'Histoire naturelle de Paris une météorite tombée, le 12 février 1875, dans l'État d'Iowa (1), adresse à l'Académie, par l'intermédiaire de notre confrère M. Berthelot, une seconde météorite provenant de la même chute, également avec prière de la transmettre à la collection du Muséum.

» Cette météorite, que j'ai l'honneur de présenter à l'Académie, est entière, c'est-à-dire entièrement enveloppée de croûte, et pèse $2^{kg},142$ (à peu près moitié de la précédente, dont le poids était de $4^{kg},650$). Elle est très-remarquable par sa forme aplatie et anguleuse, qui la fait ressembler à une grosse écaille détachée d'un morceau plus volumineux ; elle rappelle celle qui a été rencontrée lors de la chute qui a eu lieu, le 12 mai 1861, dans l'Inde anglaise, à Butsura, Piprassi, et dont la configuration s'adapte exactement à celle d'une autre météorite tombée à une assez grande distance.

» A cette occasion, M. le professeur Hinrichs exprime le désir que la chute du 12 février dernier soit désignée, non plus sous la dénomination d'*Iowa County*, qui peut donner lieu à une confusion, mais sous celle d'*Amana* : c'est le nom d'une commune dans laquelle beaucoup d'échantillons sont tombés et que les habitants ont cédés avec désintéressement. »

---

(1) *Comptes rendus*, t. LXXX, p. 1176.

C. R., 1875, 2e *Semestre*. (T. LXXXI, N° 22.) (Séance Nov 29) 134

HINRICHS' FOURTH COLLECTION OF AMANA METEORITES.

32. WM. MOERSCHEL.

30. HINRICHS.

33. AMANA SOCIETY.

HINRICHS' THIRD COLLECTION OF AMANA METEORITES.

24, 21. HINRICHS.

20, 23. HINRICHS.

22. AMANA SOCIETY.

27, 29, 25 FRED. MOERSCHEL, -26.

31, WM. MOERSCHEL. 28, A. NOË.

HINRICHS' FIFTH COLLECTION OF AMANA METEORITES.

44, 45, 47, 48 WM. MOERSCHEL. 45, GEISSLER. 34-38, 41-43, HEINEMANN.

39, 40 HINRICHS.

HINRICHS' SIXTH COLLECTION OF AMANA METEORITES.

51-72. STONES.

73-86, FRAGMENTS.

STATE UNIVERSITY OF IOWA.

HINRICHS' COLLECTIONS OF AMANA METEORITES.

COLLECTION I			COLLECTION II.		
1.	4.650	Paris, 1st	10.	3.562	Hon. John P. Irish
2.	3.793	London	11.	3.268	St. Petersburg
3.	3.620	Hinrichs	12.	3.013	Hinrichs
4.	2.856	Vienna	13.	2.663	Brussels.
5.	2.634	Copenhagen	14.	2.464	Budapest
6.	2.274	Berlin	15.	2.142	Paris, 2nd
7.	2.040	Christiania	16.	1.545	Munich
8.	1.819	Stockholm	17.	0.669	C. W. Irish
9.	0.997	Lausanne	18.	0.567	Hinrichs
			19.	0.560	C. W. Irish
	21.684	9 Stones.		20.453	10 Stones.

All of these stones were the property of G. Hinrichs: most of them were presented to the Meteorite collections of the scientific centers named, excepting No. 14 which reached Budapest by purchase from Harlem, to which it had been presented.

COLLECTION III.			COLLECTION IV.		
20.	5.761	Hinrichs	30.	111.5	Hinrichs
21.	9.500	Hinrichs	32.	62.5	Moerschel, Wm.
22.	21.100	Amana Society	33.	33.150	Amana Society
23.	1.318	Hinrichs	33.*	0.450	Hinrichs
24.	0.927	Hinrichs			
25.	0.456	Moerschel, Fr.		33.774	3 Stones and 1 Fragment.
26.	0.379	Moerschel, Fr.			
27.	0.227	Moerschel, Fr.			
28.	0.216	Noë, A.			
29.	0.159	Moerschel, Fr.			
31.	0.109	Moerschel, Wm.			
	40.152	11 Stones.			

COLLECTION V.

	Stones.	
34.	4.194	
35.	4.158	
36.	3.038	
37.	1.426	
38.	1.413	
39.	1.143	H
40.	0.731	H
41.	1.217	
42.	1.172	
43.	0.724	
44.	0.5805	
45.	0.572	
46.	0.3605	
47.	0.323	
48.	0.418	
	21.478	
	15 Stones.	

H stands for Hinrichs.

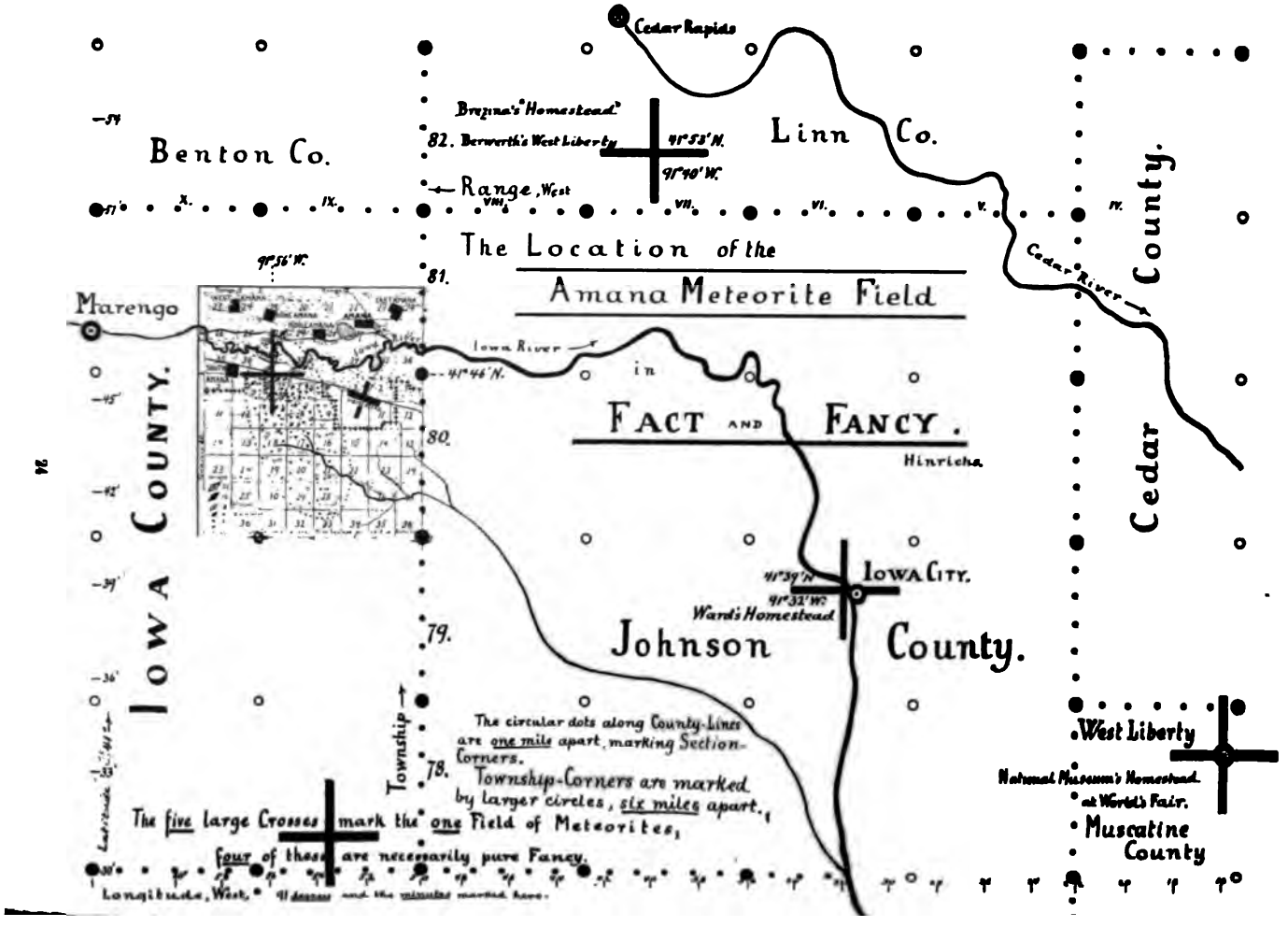
COLLECTION VI.

	Stones.
51.	6.964
52.	5.735
53.	5.588
54.	5.398
55.	4.414
56.	3.359
57.	3.168
58.	1.543
59.	1.256
60.	1.149
61.	1.067
62.	0.988
63.	0.917
64.	0.689
65.	0.680
66.	0.642
67.	0.593
68.	0.580
69.	0.491
70.	0.349
71.	0.227
72.	0.184
22 Stones	45.980

	Fragments.	
73.	7.614	
74.	1.480	
75.	1.071	
76.	0.744	
77.	0.729	
78.	0.726	
79.	0.607	
80.	0.515	
81.	0.482	
82.	0.323	
83.	0.318	H
84.	0.302	
85.	0.276	
86.	0.267	
14 Frgmts.	15.553	
Collect. VI	61.533	

SUMMARY.

I.	9 Stones	24.684 Kilos.
II.	10 "	20.453 "
III.	11 "	40.152 "
IV.	3 "	33.774 "
V.	15 "	21.478 "
VI.	22 "	45.980 "
	14 Fragmts.	15.553 "
	Sherlock Stone	2.057 "
	70 Stones and 15 Fragmts.	204.131 "


Cedar Rapids
Benton Co.
Linn Co.
Cedar County.
Brezina's Homestead.
82. Berwerth's West Liberty
91°53' N.
91°50' W.
Range, West
The Location of the
Amana Meteorite Field
91°56' W.
81.
Marengo
Iowa River
41°46' N.
in
FACT AND FANCY.
Hinrichs.
80.
Iowa County.
Cedar River
91°39' N
91°32' W.
Iowa City.
Ward's Homestead
79.
Johnson County.
Township
The circular dots along County-Lines are one mile apart, marking Section-Corners.
Township-Corners are marked by larger circles, six miles apart.
78.
The five large Crosses mark the one Field of Meteorites;
four of these are necessarily pure Fancy.
West Liberty
National Museum's Homestead at World's Fair.
Muscatine County
Longitude, West, 91 degrees and the minutes marked here.

I. THE COLLECTION AND PRESERVATION OF METEORIC STONES.

History and tradition testify to the fact that man in all ages and in all countries has seen stones fall from heaven. Usually these stones appear like big glowing coals thrown under terrific detonations from a fiery cloud, which itself has been seen to approach rapidly through the air from a great distance. In daytime the phenomenon is brilliant notwithstanding the bright sunshine; at night, the appearances belong to the most magnificent and impressive seen by man.

The stones thus coming to us are called *Meteorites*, and the entire phenomenon of light, sound and motion is called a *Meteor*.

In these pages we shall give an account of the Meteor of February 12, 1875, which showered the *Amana Meteorites* over a part of Iowa County, Iowa. Both this meteor and its meteorites are among the most notable on record.

Since current information about meteorites is not only limited but often unreliable, it seems best to preface our description of the Amana Meteorites by a few points on the history of meteorites in general.

METEORIC STONES AND IRONS.

First it should be understood that there are two entirely different kinds of meteorites, namely, *irons* and *stones*. The *meteoric irons* are most numerous, and by far the heaviest; but very few have been seen to fall. That they are meteoric is an inference, but not an observed fact. The great iron masses of Ovifak were considered truly meteoric when first brought from Greenland about 1870. They were enrolled as such in the catalogues of the great meteorite collections. Thus we find them enrolled as No. 101 in the list of Meteoric Irons of the Vienna Collection published by Tschermak, 1872. After many chemical and microscopical researches, and after repeated explorations of the geology of the inhospitable locality near the Disco Bay of southwestern Greenland, this iron is now generally considered to be terrestrial, and not meteoric.

The *meteoric stones* contrast in almost every respect with meteoric irons. They have nearly all been *seen to fall*, only very few have been found and recognized as meteoric stones by their very marked properties. Also in weight they contrast with the meteoric irons; the largest meteoric stone weighs less than one-third of a ton, while some meteoric irons weigh many tons. Further, the meteoric stones are not able to resist the action of air, water and frost on the earth; they are porous, and containing native iron disseminated, they break up and crumble, soon blending with the terrestrial materials.* On the contrary, a large mass of native iron will resist these influences for ages almost anywhere on the earth, though especially so in the drier regions of South and North America, where in Bolivia and Mexico great masses have been found.

We may therefore say: the meteoric stones really fall most frequently, but must be preserved by man, otherwise they rapidly disintegrate; the meteoric irons fall rarely, but resisting atmospheric influences have remained in great numbers from an unlimited past till the present.

CHRONOLOGICAL ORDER.

While it is true, that there exist some "connecting links" between meteoric irons and stones, which may be termed "stony irons" and are often called by the equivalent term of *siderolites*, it is to be regretted that *Brezina* in 1885, when issuing his first catalogue of the great meteoric collection of Vienna, started the fashion of totally disregarding the most striking differences above specified by recording stones and irons mixed up — and arranged artificially in what he is pleased to consider their *chronological* order.

But this order of *time* is necessarily a scientific humbug, as may be inferred from the general character of stones and irons above stated. The date or period of time when all but nine of small irons fell, is absolutely unknown; all the noted larger irons have been found, but have not been seen to fall; the most of

* The two Kansas Meteorites of Waconda, found 1874, and Long Island, found 1892, show this disintegration very markedly.

them, it is inferred, have fallen many centuries before our era. The time of discovery and description is accidental and doubtful.

It is highly creditable to the present management of this great collection that the catalogue of 1902 issued by *Dr. Berwerth* again presents the Meteorites in Vienna naturally according to their kinds: *Irons* (Nos. 1 to 209), *Stony Irons* (Nos. 210 to 232), and *Stones* (Nos. 233 to 560).

How marked the contrast between Iron and Stone really is may be taken from this record, showing first that there were at Vienna in 1902: Stones 328, Irons 209, together 537, and only 33 stony irons! Again, this same catalogue shows that for only 9 irons was their *fall* observed, while only 26 stones recorded were *not* seen to fall — and these stones are listed by themselves at the close of the record.

The directors of the Meteorite Collection of the British Museum at London, both Maskelyne and Fletcher, have respected the great natural distinction of the Meteorites in Stones (Aerolites) and Irons (Siderites), loosely linked by a few Stony Irons (Siderolites). The great Meteorite Collection of Paris, so rapidly developed in the hands of *Daubrée* (see frontispiece) has, under his successor *Meunier*, in the catalogue of 1882, scattered the natural material into 57 artificial subdivisions and in its latest list (1898) adopted the "chronological order" of Brezina while at Vienna this disorder was being suppressed.

I may add that the National Museum at Washington in its catalogue of 1902 follows the scientifically absurd order of Brezina, while the catalogue of the great Ward-Coonley Collection (1904), though influenced by Brezina in many ways, enumerates the Meteorites in their natural classes, conforming to the unbroken example of the British Museum.

MAGNITUDE AND FREQUENCY.

My own investigations into the relations between magnitude and frequency of meteorites have demonstrated the folly of considering the meteorites under one head.

These investigations have permitted the numerical expression of the contrast in weight between these two classes of meteorites.

I find that at the opening of the present century, the meteorite collections of the world contained stones and irons in the proportion of one to eight by weight. Since the weight of large irons greatly influences this proportion, the recent recovery of three enormous iron meteorites has raised this proportion so that it is about one to fifty; that is, for every pound of meteoric stones in collections, we now have about fifty pounds of meteoric irons.

It thus appears that the meteoric stones are the most valuable and most important meteorites; they have actually been seen to fall by many people, and great multitudes have both seen and heard them arrive through the atmosphere as a brilliant, fiery meteor, visible over a great region of territory; their characters are so marked as to form, structure and composition that their identity is established by themselves even if without a label; their amount in weight is generally quite moderate, and in the largest fall on record reaching only one third of one ton (Knyahinya, Hungary, 1866), while masses of meteoric iron are known, still partly imbedded in the soil of Mexico, the weight of which is estimated well up to one hundred tons.

We shall then, in the following, limit ourselves to the consideration of meteoric stones.

METEORITE WORSHIP.

The meteoric stones, coming to man as fiery messengers from above, have nearly always been gathered and preserved with care. In the earlier ages, they were preserved in temples and received worship; medals, representing them in their shrines, were struck by emperors, and from captured provinces they were removed to the capital with great dignity. Space forbids to enter here upon the fascinating details.*

The oldest meteoric stone known to-day has been preserved as an object of worship in the Kaaba of Mecca; it was known

* Joshua (x: 11) says: "The Lord cast down great stones upon them * * * and they died * * * more than the children of Israel slew with the sword." This happened more than three thousand years ago. Haidinger has pointed out similar statements in ancient Greek works. The "Betyl" Medals and Coins from 300 B. C. to 300 A. D. have been collected especially at Vienna, and described by Brezina. See also Phipson: Meteors, Aerolites and Falling Stars. London. 1867.

before the advent of Mohamed, and thus has been preserved for probably one and a half thousand years.

THE ENSISHEIM METEORITE.

The oldest meteoric stone preserved by our own race fell, about the time of the discovery of America, on the 16th of November, 1492, near the village of Ensisheim in Alsace, then, as now, a province of the German Empire. The German Emperor Maximilian I. happened to be in the province at the time, and ordered the stone, weighing nearly three hundred pounds, to be suspended by a chain in the church of the village Ensisheim, where the bulk of it remains to-day.*

During the four centuries this noted meteoric stone has been preserved in that little church of Alsace, the province itself was by wars torn from the German Empire and remained for two centuries with France, till in 1871 another war restored it to the German Empire, itself renewed. The meteoric stone was not disturbed in the church to which Emperor Maximilian had intrusted it, except for a while during the great French Revolution, when the stone was dragged to the Colmar, the capital of the Province, and considerably reduced in weight. Nine kilogrammes thereof were sent to Paris, and are now in the great Museum of Natural History of the Botanical Garden.

Specimens of this oldest meteoric stone are distributed in modern collections as follows: —

Ensisheim and Paris have						total	63.90	kilos.
5	Collections	have over	0.3	Kilo	each,	total	3.41	"
10	"	" "	0.1	"	"	"	1.91	"
11	"	" "	0.03	"	"	"	.76	"
16	"	" "	0.01	"	"	"	.35	"
21	"	" less than	0.004		"	"	.10	"
Total recorded (1897)							70.42	"
(or 155 pounds English).								

* At the request of Dr. Wülfing, author of "Die Meteoriten in Sammlungen, 1897," this stone was weighed, January 23, 1896, by the burghomaster of Ensisheim, who found its weight 54.8 kilos, or 111 lbs. English.

We have recently been able to procure a specimen of 5 grammes for $3.00, that is at the rate of 60 cents a gramme or 4 cents a grain. The most noted meteorite dealer of Europe (Krantz in Bonn) offers a specimen of 60 grammes for 180 marks, that is at 3 marks or 75 cents a gramme. It is difficult to secure any sample of this and other older meteoric stones. The market value of these meteoric stones will be best appreciated by remembering that a gramme of pure gold is 66 cents, less than an equal weight of Ensisheim Meteorite.

It may interest the reader to estimate the present money value of the two largest specimens of this oldest meteoric stone at the rate paid by us, viz., 60 cents a gramme: —

Stone at Paris,	9.1	kilos	$ 5,460
" " Ensisheim	54.8	"	32,880
All specimens known	70.4	"	42,240

The most noted account of the fall of this meteoric stone is by the German poet of the time, Sebastian Brandt. An illustrated edition of this poem is at the library of the University of Basel, Switzerland. The founder of the first modern school of chemistry, Paracelsus, on his flight from Basel, stopped at Ensisheim to study the stone, of which he gives an account in his little work *De meteoris.**

METEORIC STONES OF THE 18TH CENTURY.

Having dwelt rather long with this, the first preserved large meteoric stone of modern times, we will have to consider very briefly some of the most important facts of the early days of collecting meteoric stones, up to the beginning of the nineteenth century.

It is strange that the second notable meteoric stone in our collections comes from Japan, where it fell about the year 1730 at Ogi near Hizen on the island of Kiu-Siu. The total weight collected was 10.2 kilos, and consisted of two stones about 5 kilos

* We are under obligations to the distinguished historian of chemistry, Professor Georg W. Kahlbaum, for this information, and also to his assistant, Dr. G. Zapf, for a copy of passages from that work of, Paracelsus.

each (5.6 and 4.6). Since 1882 one mass passed into European hands; in the catalogue of 1890 the British Museum shows 4.2 kilos, and Wülfing (1897) credits only 0.1 to 5 other European collections (average 20 grammes each).

Probably this stone was preserved in some temple in Japan until the wide-awake keepers took advantage of the valuable scientific material, precisely as we know it happened with the meteoric stone of Kesen, Iwate, Prov. Hondo, Japan, which fell June 13, 1850. It was preserved* in a Buddhist Temple till 1892. The Vienna Collection had nearly half a kilo in 1895; the British Museum had none in 1894, when I received from the keeper, *L. Fletcher* the list of 1890 with his manuscript record of additions till middle of 1894. A total of 7.1 kilos was in 18 of our modern collections in 1897, of which the British Museum has 1.3 kilos. Ward-Coonley now has nearly 2 kilos. My collection contains 16 grammes.

How well meteoric stones were collected and preserved during the last half of the eighteenth century — that is after Ogi, Japan — may be seen from the following record: —

		Weight in Kilos.		
Year.	Place.	Total.	Recorded.	Principal.
1753	Tabor, Bohemia	7	6.6	4.1 Vienna
1768	Mauerkirchen, Bavaria	19	12.6	7.7 Munich
1773	Sena, Spain	4	2.1	1.8 Madrid
1785	Eichstädt, Bavaria	3.2	1.2	0.5 Munich
1794	Siena, Italy	swarm	4.2	1.1 Siena
1795	Wold Cottage, England	25.1	21.2	20.1 London
1796	Bjela-Zerkow, Russia	big stone	1.8	1.4 Kiew
1798	Benares, India	many stones	2.4	0.7 London

It appears that in 1753 almost the entire mass originally fallen was collected, of which two-thirds has been preserved at the capital of Austria. In Bavaria in 1768 two-thirds of the original mass was collected and the bulk of it preserved at the capital of the State. In 1885 the Bavarians did quite as well with a much

* And worshiped according to Brezina: Address on New Meteorites, delivered at Munich. 1893.

HINRICHS' COLLECTIONS OF AMANA METEORITES.

COLLECTION I			COLLECTION II		
1.	4.650	Paris, 1st	10.	3.562	Hon. John P. Irish
2.	3.793	London	11.	3.268	St. Petersburg
3.	3.620	Hinrichs	12.	3.013	Hinrichs
4.	2.856	Vienna	13.	2.663	Brussels.
5.	2.634	Copenhagen	14.	2.464	Budapest
6.	2.274	Berlin	15.	2.142	Paris, 2nd
7.	2.040	Christiania	16.	1.545	Munich
8.	1.819	Stockholm	17.	0.669	C. W. Irish
9.	0.997	Lausanne	18.	0.567	Hinrichs
			19.	0.560	C. W. Irish
	24.684	9 Stones.		20.453	10 Stones.

All of these stones were the property of G. Hinrichs; most of them were presented to the Meteorite collections of the scientific centers named, excepting No. 14 which reached Budapest by purchase from Harlem, to which it had been presented.

COLLECTION III			COLLECTION IV		
20.	5.761	Hinrichs	30.	111.5	Hinrichs
21.	9.500	Hinrichs	32.	62.5	Moerschel, Wm.
22.	21.100	Amana Society	33.	33.150	Amana Society
23.	1.318	Hinrichs	33.*	0.450	Hinrichs
24.	0.927	Hinrichs			
25.	0.456	Moerschel, Fr.		33.774	3 Stones and 1 Fragment.
26.	0.379	Moerschel, Fr.			
27.	0.227	Moerschel, Fr.			
28.	0.216	Noë, A.			
29.	0.159	Moerschel, Fr.			
31.	0.109	Moerschel, Wm.			
	40.152	11 Stones.			

COLLECTION V.

	Stones.	
34.	4.194	
35.	4.158	
36.	3.038	
37.	1.426	
38.	1.413	
39.	1.143	H
40.	0.731	H
41.	1.217	
42.	1.172	
43.	0.724	
44.	0.5805	
45.	0.572	
46.	0.3605	
47.	0.323	
48.	0.418	
	21.478	
	15 Stones.	

H stands for Hinrichs.

COLLECTION VI.

	Stones.		Fragments.	
51.	6.964	73.	7.614	
52.	5.735	74.	1.480	
53.	5.588	75.	1.071	
54.	5.398	76.	0.744	
55.	4.414	77.	0.729	
56.	3.359	78.	0.726	
57.	3.168	79.	0.607	
58.	1.543	80.	0.515	
59.	1.256	81.	0.482	
60.	1.149	82.	0.323	
61.	1.067	83.	0.318	H
62.	0.988	84.	0.302	
63.	0.917	85.	0.276	
64.	0.689	86.	0.267	
65.	0.680	14 Frgmts.	15.553	
66.	0.642			
67.	0.593	Collect. VI	61.533	
68.	0.580			
69.	0.491			
70.	0.349			
71.	0.227			
72.	0.184			
22 Stones	45.980			

SUMMARY.

I.	9 Stones	24.684 Kilos.
II.	10 "	20.453 "
III.	11 "	40.152 "
IV.	3 "	33.774 "
V.	15 "	21.478 "
VI.	22 "	45.980 "
	11 Fragmts.	15.553 "
	Sherlock Stone	2.057 "
	70 Stones and 15 Fragmts.	204.131 "

science is doubly blocked when eminent scientists bar the way, and the time of such blocking is not all in the *past* — what there is of it in the *present* will, however, not be known to the many until this present shall have become the past.

COLLECTING METEORIC STONES.

The gathering of meteoric stones after their fall is not so easy a task as may be supposed; often but very little material is actually procured. We will give a few instances of this kind.

At Searsmount, Maine, there fell meteorites in 1871 estimated at 5 kilos; but less than half a kilo was secured, of which Washington has 62, London 51, and Vienna 30, in all only 143 grammes.

At Perth, Scotland, 7 stones were seen to fall in 1830; but only one and a half grammes (22 grains) at the British Museum in London are left to testify of this fall.

In 1863 a stone, estimated to weigh about 3 kilos, fell near Sanguis, France — into a brook, broke into many small pieces of which only $\frac{1}{5}$ kilo now remains in 10 collections, the largest piece being at Paris and weighing 0.15 kilos (about 5 ounces).

In 1887, at San Emigdio Range, San Bernadino County, California, among the stuff fed to a stamp mill, there was detected a meteoric stone, as it was being crushed; only 180 grammes could be identified, 119 of which are at Washington, while 9 other collections have 61 grammes in all.

Sometimes apparently the total mass of a meteoric stone-fall is carefully searched for — and is found to amount to only very little in weight.

The most noted instance of this kind is the search conducted by one of the most successful pioneers in the study of meteorites, von Reichenbach, who for days with the help of many men carried on a systematic search for the stones which had been seen to fall from a detonating meteor near Blansko, Moravia, Austria, on November 30, 1833. Eight stones were found, weighing 350 grammes (about 12 ounces) in all. This material is now preserved in 13 collections, of which Tübingen (88 grammes) and Vienna (69 grammes) contain the most.

Sometimes, not even a particle of a meteoric stone gets into our scientific collections. Near a little town with a very long name * in the Vendée of France, in a vineyard, fell a meteoric stone on September 6, 1841. The attending phenomena of light and sound frightened the people. On the day after the fall a man, not owner of the vineyard, hunted up the stone, which weighed over 5 kilos (over 11 lbs.). Then the owner of the land claimed the stone. A protracted lawsuit was finally decided in favor of the finder, who retained the stone. Not a particle thereof has been secured for any collection.†

On August 16, 1885, a meteoric stone weighing 1.3 kilos (nearly 3 lbs.) fell at Sabetmahet in the province of Oudh, India. The inhabitants absolutely refused to surrender the same. Only 3 grammes (45 grains) thereof have somehow reached the great collection of meteorites at Calcutta, India.

LOCATION OF THE MAIN PORTION.

Finally it may be interesting to notice where the *principal portion* of such meteoric stones are preserved. It is but natural to expect that the largest specimens will be retained at the place of fall (Ensisheim above) or at the meteorite collection of the capital of the province or country. Stones found in the colonies are often largely taken to the capital of the ruling country. Since now England has the most extended and best managed colonies of all, it follows that the British Museum is the richest in meteorites. Austria has no colonies, but exerts a preponderating influence in southeastern Europe, which has contributed to make the collection at Vienna a close second to that of London.

Russia and the United States are the most extended countries on the globe, and both have large collections of meteorites. It would be exceedingly interesting to go into this subject and give demmonstrative facts for the general statements made.

While we have not room for the numerous facts proving the

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* Saint Christophe la Chartreusse.

† Wülfing, p. 300. Buchner, p. 67. Daubrée, Comptes Rendus, T. 91, p. 30. 1880.

rules stated, we shall take space to present a few striking exceptions to the same.

Berlin has the largest amount (12.8 kilos) of the meteoric stones which fell in 1883 at Alfianello, Italy; Rome has 7.6 kilos only.

Vienna has the greatest part (45 kilos) of the big meteoric stone which fell in 1872 at Lancé, Dptm't Loire et Cher, France, Paris has only 1.5 kilos. It has also the largest amount of the French meteoric stones of Chantonnay (2.8 of 10 kilos) and Jonzac (0.3 of 1.5); of the Indian Benares (0.7 of 2.4), the Turkish Seres (6.5 of 7.3), the Russian Bjelokrynitschie (0.6 of 1.7) and the American Bath, South Dakota (2.8 of 14.2); Castalia, North Carolina (5.5 of 6.3) and MacKinney, Texas (46.7 of 79.6). All weights are given in kilogrammes.

London has the greatest part of Charsonville, France (2.4 of 6.9); Mornans, France (1.1 of 1.2) and Ogi, Japan (4.2 of 4.3); Mr. Gregory, at London, had 4.0 of 7.4 Pipe Creek, Texas.

Paris has the greatest part of Pultusk, Russia (30 of 200); Tourinnes, Belgium (1.3 of 3.4) and Berlanguilas, Spain (1.0 of 1.4). This last stone fell in 1811, when Napoleon ruled Spain.

Budapest, Hungary, has the greatest part of Chateau Renard, France (3.7 of 17.9).

Tübingen, Germany, has the greatest part of Borkut, Hungary (3.4 of 4.1), and of Lissa, Bohemia (4.3 of 12.4).

The last two exceptional cases are due to Budapest getting the collection made by Baumhauer and Tübingen that of Richenbach.

It will be noticed that the acquisitions of foreign meteoric stones have been most noted in Vienna, where the scientific study of meteorites has had most distinguished workers for the longest time, thereby more than compensating for the lack of tributary territory. The collection at London has enjoyed and been almost fully occupied by working the greatest tributary territory, the vast English Colonies in Asia, Africa, America and Australia; it has only taken three noted cases from without its dominion.

Of French meteorites we find a larger number of cases repre-

sented by the greatest specimens outside of France, namely 3 in Vienna (Lancé, Chantonnay and Jonzac), 2 in London (Charsonville and Mornans) and 1 in Budapest (Chateau Renard). This exodus started with the scientific rejection of Lucé (1768) above referred to.

Hoping that the reader now has acquired some insight and therefore a corresponding interest in the various phases of the acquisition of this most precious extra-terrestrial material, we shall proceed to tell the history of the Amana Meteorites after stating very briefly the circumstances attending their advent to the territory of Iowa County, Iowa, in the great meteor of February 12, 1875.

II. THE GREAT IOWA METEOR OF FEBRUARY 12, 1875.

On the evening of Friday, February 12, 1875, at twenty minutes past ten o'clock, one of the most brilliant meteors of modern times illuminated the whole State of Iowa, and adjacent parts of the States of Missouri, Illinois, Wisconsin and Minnesota. The entire southeastern portion of Iowa was illuminated as bright as day, and the meteor itself was observed from Saint Louis in the South to Saint Paul in the North, and from Omaha in the West to Chicago in the East.

With much patience and skill, my friend and fellow townsman, *Charles Wood Irish*,* collected and carefully studied all obtainable observations of this meteor, and published his results in two quarto pamphlets of 16 and 10 pages with map and illustrations, to which I must refer for details on this subject.†

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* Born Feb. 11, 1834, in New York City; died Sept. 27, 1904, at Gold Creek, Nevada. He was, for many years, surveyor-general of Nevada.

† *An Account* of the Detonating Meteor of February 12, 1875. By C. W. Irish, C. E. Iowa City, Iowa. Daily Press Job Printing Office, 1875. 16 pp. quarto, with map.

Appendix to same by same. 1876. 10 pages quarto, with cuts and chart.

Mr. Irish being an experienced engineer, actually traveled to many points from which he had received observations, set up his instrument and took bearings and elevations by the theodolite, according to the direction of the parties who had reported to him. In this way he tried to make as sure as possible of the facts from which to determine the orbit and velocity of the meteor.

THE ORBIT OF THE METEOR.

I have, in my previous publications* stated the results, entirely on his authority. He traced the path of the meteor for about 210 miles, which was described in about 10 seconds, so that the velocity of the meteor was about 21 miles a second — a truly planetary velocity.

He estimates the meteor to have appeared as a pear-shaped mass of the most dazzling whiteness, about 2,000 feet long and 400 feet wide, leaving a white trail about 4,000 feet long and 40 feet wide. This white trail shaded from orange inward to greenish outward into a more persistent, much less brilliant trail extending about nine miles along the track of the meteor, which descended under an angle of about 45 degrees in a northerly direction towards Iowa County, turning considerably eastwards as it reached the lower and denser strata of the atmosphere. This track is shown on the map of Iowa, printed page 9 of the present publication.

The turn to the right is normal for all motions on the northern hemisphere, as is well understood; it is, however, interesting to notice how strongly marked it was in this case.

THE APPEARANCE OF THE METEOR.

Persons near the track of the meteor saw a brilliant circular disk of white light, surrounded by an orange to greenish halo, the dim light of which was constantly traversed by narrow bands

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* The Great Iowa Meteor. Popular Science Monthly for September, 1875. This was translated into French by H. Goll and published in the Bulletin Vaudoise, Tome XIV, pp. 576–584, 1877, mars.

of brilliant white, running from the central disk in irregularly-curved lines toward the circumference. As this body rapidly approached, increasing in brilliancy and apparent magnitude, both men and animals were overcome with fear.

When the meteor crossed Keokuk County * (just south of Iowa Co.), it was seen to divide into two unequal parts. The larger portion remained brilliant till it exploded over Benton County (just north of Iowa Co.). The smaller portion rapidly lost its brilliancy, turned red, and after great detonations seemed to throw glowing coals to the ground above "*Iowa* Township of *Iowa* County of the State of *Iowa*, mainly south of the *Iowa* River, twenty miles west of *Iowa* City." This monstrously monotonous designation, we have supplanted by the name of *Amana* of the colony or Society on the extended territory of which the greatest meteoric stones, "the glowing coals" were thrown and found seven weeks later. See our map, page 8.

DETONATIONS AND OTHER SOUNDS.

While dividing, the meteor produced two tremendous detonations and, after the "main body" had crossed the town of Marengo in Iowa County, it (the main body) produced three terrific detonations, which shook the buildings for miles around, so as to create in the residents the fear of an earthquake.

Besides these detonations, the meteor caused a variety of other sounds, heard over a circular area of 150 miles in diameter.

This area, over which *the meteor was heard* as well as seen, is represented on the upper map, p. 9, by the shaded portion. To the people farthest away from the path of the meteor it sounded as if their chimney were on fire, and an astonishingly large number of persons missed the rare sight of the great meteor because they hurried to their stoves and flues to find and check the apparent conflagration; the weather being intensely cold, everybody had made a good fire. Those nearer the track heard a prolonged

* See lower map, page 9.

rumbling and rolling sound, which they compare with that produced by the running of a train over a high and long trestle-bridge. Others, still nearer the region of final explosion, hurried upstairs, thinking that the plastering had fallen on the heads of their children sleeping in the upper rooms; many persons in this nearer region heard the clank and clatter of heavy, hard bodies striking against each other or against the hard frozen ground.

THE TERMINATION OF THE METEOR.

It ever remained the firm conviction of Mr. C. W. Irish, that the main body of this meteor must have thrown on the fields of Benton County a proportionately larger amount of meteoric stones than was gathered near Amana, Iowa County, in April and May. Many inquiries and examinations were made on expeditions continued for several years to obtain some evidence of the estimated hundreds pounds of meteoric stones strewn from the main portions of the great meteor. But absolutely no trace of such meteorites has been found.

The point of final explosion of this greater and brighter part of the meteor was located by Mr. Irish* at longitude 91° 40′ W. of Greenwich, and latitude 41° 53′ North. This point is marked F on his map accompanying the "appendix," but while corresponding in latitude, the longitude thereof is 91° 58′, and not 91° 40′. Whatever be the cause of this discrepancy (possibly some error in copying, afterwards unwittingly carried over as correct) this point long. 91° 40′ W. and lat. 41° 53′ N., given by Mr. Irish as the geographic position of the point over which his "main portion" of the great meteor exploded — has been thoughtlessly copied in the records of the great Vienna Collection of Meteorites as the place where the *meteorites actually collected* were found. This very serious blunder has been put in print by Brezina in his Catalogue of 1885 and has passed unchanged into those of 1895 and 1902. — See my extra map, page 24.

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* See the last three lines of the opening paragraph of six lines of his "*Account.*"

ESTIMATES, NOT MEASURES.

Looking to-day at this conclusion that a much larger meteoric mass must have been showered on eastern Benton (91° 58′) or western Linn (91° 40′) County from the larger and higher part of the great meteor, I confess that I am inclined to believe the probable errors in locating the critical points in the orbit of the meteor were much greater than taken into account. We need only put ourselves in the place of the observer, who under the spell of the great phenomenon would hardly make close quantitative estimates as to the points now in question and could not afterwards, when the instrument was set up, point the same with much accuracy in the direction where to their best recollection they believed they saw the particular part at the time when they witnessed all the varied phases of the great phenomenon.

Without further consideration of possibilities, we admit that the great meteor seemed to divide into two parts; a larger, brighter one passing further north, and a smaller part throwing the meteoric stones on Iowa County. As a matter of fact, no meteoric stones have been obtained from the apparently greater and brighter part of the meteor. Therewith fall all extravagant statements of the total weight of meteoric stones carried by this great Iowa Meteor.

One other point we have to touch upon to prevent misunderstanding. We have given the dimensions of the meteor, as estimated by the noted engineer. But the brilliancy of the phenomenon causes, at least by irradiation, an unavoidable exaggeration of all estimates, so that the values given must necessarily be looked upon as higher limits.

The comparatively "persistent and rather faint trail, extending for about nine miles along the track of the meteor" is not subject to this error; it has almost always been seen in connection with brilliant meteors, and is well understood to consist of material particles dissipated mechanically by the air from the heated body and also from the actual combination of the iron, sulphur and phosphorus of the stone.

In conclusion I wish to say that the above limitations of the original statements and conclusions are not intended to detract in any manner from the very meritorious work of Mr. C. W. Irish, who at very great labor and with much skill has determined in the best possible manner the orbit and appearances of the great Iowa Meteor of February 12, 1875.

III. GATHERING THE STONES.

A great many people had seen "glowing coals" fall from the meteor after its detonations, and many had heard bodies fall through the air or strike the hard frozen, snow-covered ground. Consequently many persons were on the look-out for meteoric stones the first day, after the brilliant meteoric phenomena of Friday, February 12, 1875.

THE SHERLOCK STONE.

The first meteoric stone was found three days after the meteoric display. It was found by Miss Sarah Sherlock while on her way from school to her father's farm. The map (p. 8) shows the locality. The school, a common frame district schoolhouse, is in sight by a passenger on the Rock Island Railroad between the stations South Amana and Homestead, looking south. The schoolhouse is entered on the map on the east road-line of Section 6, Township 80, Range IX. The farmhouse of the father, Mr. Luke Sherlock, is marked on Section 5. The stone was found on the southeast quarter section; its place is indicated by a black triangle designating its weight, and a number (here zero) referring to its order on my list of meteoric stones. The signification of the symbols used is explained under and in the left lower corner of this map.

This particular stone is the *only* meteoric stone found that has been exposed to the elements less than three full days; all the other stones were exposed to the elements for over six weeks,

during which time the air, water and changing temperature have acted upon these materials.

Accordingly this one meteoric stone found by Miss Sherlock, must be considered the *type specimen* for this meteor; hence we distinguish it as the "*Sherlock Stone*" from all the other meteoric stones found later.

AMERICAN MAPS.

Here it may be advisable to say a few words about our map (p. 8), especially to the readers not familiar with American maps and the division and designation of lands in the United States.

The land is first divided into (Congressional) Townships of *six miles square* (36 square miles); these are numbered *northward* as Township (T.) and *westward* as *Range* (R.). On our map (p. 8), is represented the entire "Congressional Township, T. 80, R. IX," as marked on *left* and *upper* margin of the map. The individual thirty-six *Sections*, each one square mile, are invariably numbered in the order shown on the map, running continuously from the northeast corner west, then east, till the last (36th) section of the southeast corner of the township is reached. Each section is divided into four quarter sections (NE, NW, SW, SE).

In this manner, every point within half a mile is accurately located and accurately designated by a few general terms. For example, "the Sherlock Stone was found on the southeast quarter of Section 5, Township 80, Range IX, West" gives its exact location on any American Section Map. Our map (p. 8), contains also the adjacent *four* sections of T. 81, R. X, and twelve sections each of T. 80, R. X, and T. 81, R. IX, as will readily be seen. Compare also map, p. 24, showing a much larger extent of territory, *including* that represented by map, p. 8.

It will be of interest to European readers to know that such an American township of 6 miles square is very nearly equal to a *square myriameter;* for six miles are very nearly equivalent to 10 kilometers or one myriameter.

Finally, the roads are generally made along section lines as

plainly shown on the lower half of our map. The full drawn lines, limiting sections, are actually maintained and used as public roads.

THE AMANA SOCIETY.

But on the upper half of our map (p. 8) hardly any section lines are drawn out full, showing that there the roads have not been made along the section lines. By inspection it will be seen that the *section road-ways* marking of the land in squares a mile each side are not continued above the broken line marked by the signs of + + all across and designated below the map as the "*South line of the Amana Society's Land*," through which the Iowa River winds its much lengthened, crooked way. The people of the Amana Society have built their excellent roads following the most practical lines according to the topography of these lands, as has been done generally in Europe; while in America, roads have been made on the geometrical surveying-lines without regard to the configuration of the land — over steep hills, through deep sloughs, as the square demands.

There is still another, and to the visitor probably a more striking difference between the northern and southern half of the territory represented by our little map (p. 8). Throughout the southern portion, we see individual *farmhouses* located on each section of land, and at convenient distances the little white frame schoolhouse are seen, each one with its one-acre (about one third of a hectare) of school ground.

In the landscape represented by the northern half of our map not a single, isolated farmhouse can be detected; but at comparatively short distances apart, seven flourishing villages are seen, composed of rather roomy houses, with a goodly number of larger eating houses built of stone, and at the end of each village there is located an immense barn, seemingly sufficient to serve as granary for an entire province.

Again, if a traveler should visit the territory represented by our little map (p. 8) during the *growing* season, when the fields require the labor of the husbandman, the traveler in the southern portion would see the lonely farmer and his few helpers plowing

or cultivating the fields inclosed by the square-lined roads, while in the northern half the workers would appear in large groups progressing in regular lines, working their common property in common.

In fact a large part of northeastern Iowa County is the property of the *Amana Society*, which holds all worldly goods in common as they understand it was practiced by the early Christians, and as they believe it was taught by the founder of the Christian Religion.

This now great and flourishing Community was founded by men firm in the faith, in middle Germany, almost a century ago. They tried to live according to their faith, but met ridicule, and even persecution; hence they did as so many others have done,— they followed the setting sun to the "land of the free" and settled near Buffalo, N. Y., more than a half a century ago.

The leaders of this community were truly leaders; they foresaw the growth of the country, and for the price of their lands in the East obtained the immense tract of finest Western farming lands, which they have, by their united labor and skill, made to blossom like the rose and have made it flow with milk and honey.

The present value of the property of the Amana Society is estimated at several million dollars.

In the seven populous villages of the Amana Society there is no pauper, not a single poor man — and there is no rich individual, no millionary. In the colony there is no haste, no rushing to, at or from work; and yet all have everything needful in abundance, all are healthy and seem to be happy. But I must check myself — for I regret I cannot, at this time, give an account of the most interesting Amana Society, but must confine myself to the subject of the Amana meteorites.

However, I will here add: I am thankful that the wonderful meteorites gave me the opportunity to spend many hours — many days — on the lands and in the homes of the strong and upright, faithful and kind people of Amana.

But what means the name Amana? The people, living as they believe, the life of the early Christians, are great students of Scripture. They have named the garden which they have

made out of a fertile slice of our American prairie with its hills, river and forest, after a passage (canticle 4, verse 8) of the Song of Solomon: —

"Come with me from Lebanon, my spouse, with me from Lebanon; look from the top of *Amana*, from the top of Shenir and Hermon, from the lions' dens, from the mountains of the leopards."

The Amana Society has called its chief settlement *Amana;* they dug a mill race seven miles long (see map) to make the flowing water drive the wheels of their great woolen mills at this chief settlement. Five other villages they also designate as "Amana" but distinguish them as "*East* Amana," "*West* Amana," "*South* Amana," and *Middle* Amana" according to direction, and "*Höhe* Amana" on account of its location on the most notable elevation. Finally, they called their seventh village *Homestead*, which constitutes, as it were, the principal "port of entry" of the Amana Colony, being located on the Chicago, Rock Island and Pacific Railway.

It was at this station Homestead, in the little railroad office (where all employees are members of the Amana community) that the *dealers in meteorites* came to buy meteoric stones in April and May, 1875. But we anticipate; we have not yet told how and when the great number of big stones were found.

WHY NO STONES WERE FOUND TILL SPRING SET IN.

After the first meteoric stone (the Sherlock) had been found, the lookout for meteorites became more active, especially as an offer of two dollars a pound had been made for any specimen of meteoric stone that might be brought in.

However, week after week passed, without any single specimen being detected in the region where "glowing coals" had been seen to fall on the evening of February 12.

The principal reason for the failure of detecting any of the many large stones we now know to have been scattered over the field marked on our map (p. 8) was the heavy layer of snow covering the ground and the extremely cold weather prevailing.

The winter months of January and February, 1875, were ex-

tremely cold. The record of my observations shows that during the first five decades (ten-day periods) of the year 1875, the lowest minimum temperature was 22 below zero Fahrenheit in each of these decades (—30 degrees Centigrade), excepting the third decade of January when the lowest was 13 below zero (—25 degs. C.) only. The mean temperature of the first and second decades of January and February was 6 below zero Fahrenheit (or —21 degs. C.) while that of the third decade of January was 7 above zero (—17 degs. C.).

During the third decade of February, the temperature began slowly to rise, but the first decade of March still had a lowest minimum of 21 degrees below zero Fahrenheit (about —30 degs. C.).

About 16 inches of snow fell up to February 10th, which during the intense cold remained as a deep snow cover on the ground, hiding any meteoric stone of moderate dimension.

MANY STONES ARE FOUND IN APRIL AND MAY.

Finally, rain set in during the last decade of March, with a thunderstorm on March 25th, after which farm work became possible, when early in April the first finds of meteoric stones were made, notably while plowing. As these stones were promptly bought at the little Homestead railroad station, the fields soon were thoroughly searched and in about two months all the stones seemed to have been picked up — for since then hardly any new finds have been reported.*

The first one of these specimens I received quite early in April; it is my number 3 in Collection I, represented in the middle of the lower row on plate, p. 6. It weighs 8 pounds (3.620 kilos), and has a remarkable form. It is rounded wedge-shaped, as if it formed the outer portion of a disk with sharpened edge; it is completely covered with a crust, except the fracture at the right

* Dr. Charles F. Noë (son of A. Noë, specially referred to further on) recently traversed the Meteorite Field without finding any specimens in the possession of the people. The search made in 1875 evidently was thorough.

near the label number 3. The finger marks or pittings are deep, and somewhat in line, as if a longer scale had sprung off from the stone while yet high in the atmosphere.

A closer inspection reveals three distinct fractures, not counting the new fracture entirely gray and without any crust, just to the right of the label 3. These three distinct fractures are covered respectively with a black, a brown and a very thin not completely continuous blackish crust. These three forms of crust represent as many consecutive fractures or breaks of the original stone, as is well known.

The first larger purchase of stones was made on Saturday, April 10, 1875, at the farmhouse of Mr. J. Donaldson on Section 8, T. 80, R. IX, entered on our map (p. 8). On this trip I had the valuable personal and financial assistance of the Hon. John P. Irish, editor of the *State Press* at Iowa City, a leading Democrat and brother of C. W. Irish before mentioned. He had represented our county in the State Legislature, and had served as Trustee of the State University of Iowa in which since 1862 I had been professor. His services in that position were so valuable to the best interests of the institution and therefore so objectionable to an influential political group that Mr. Irish was legislated out of office — the Board of Trustees being changed into a Board of Regents. In my report in the Comptes Rendus* of the Academy of Sciences of Paris I had the pleasure of acknowledging the assistance of Hon. John P. Irish in my work of collecting the meteorites.

In this work I also received most valuable assistance from several members of the Amana Society, first Messrs. William Moerschel and Frederick Moerschel of Homestead, later also Mr. A. Noë, Doctors Fehr and Winzenried and druggist Conrad Schadt at Amana. These excellent gentlemen kindly confided to me, for study, the numerous and even unique specimens that were not to be sold, could not be had for money; all of these have been returned to their liberal owners with hearty thanks. It is

* The Session on May 3, 1875; Tome 80, p. 1175. — A translation hereof I published in the *Daily Press* of Iowa City.

due to this enlightened policy of the good people of Amana that it was possible for me to photograph and thus preserve for science the almost quarter of a ton of fine meteoric stones comprised in my six collections represented by good halftones in this work.

MY SIX COLLECTIONS, HOW MADE.

A general view of these six collections is shown in *one-tenth* natural size on pages 4 and 5. These six collections are separately shown in *one-fifth* natural size by halftones on pages 6, 7; 18, 19 and 20, 21. The individual weights are given on pages 22, 23; general summary of weights page 5 and page 23.

I have not directly been presented with any specimens by the Amana gentlemen,* nor have I asked such favor; but I have, through their kindness, been enabled to select all the best stones that came into the market at Homestead, much better than if I had been a permanent resident of the place. My friends would naturally see every meteoric stone that was for sale; after a few personal visits they knew exactly what qualities I desired to secure, and they would retain for me at an advanced figure to secure the best, first choice, specimens. My photographs of the first five collections compared to that of VI. show that we did secure the best specimens in this way.

All inferior specimens were left for other collectors to buy. As most of these specimens afterward were acquired by the State University, I obtained after a couple of years, also these specimens for temporary study and have represented the best of them in Collection VI. I recently saw that only seven of the 36 specimens (22 stones and 14 fragments) of Collection VI. weighing over 60 kilos, remains at that institution.

Of the stones represented in Collection V. the last five (Nos. 44 to 48) were not for sale, but loaned to me by Messrs. Wm.

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* Excepting the two small specimens 30 and 33* aggregating half a kilogram, as will be stated further on.

Moerschel and Geissler of Homestead, and returned to them, with thanks, December 12, 1875. On the first ten stones of this collection, I held an option to buy at a specified price; but I retained only two specimens (Nos. 39 and 40) and returned the others August 24, 1875, to the owner, Mr. George Heinemann, of South Amana.

I since have regretted that I did not pay the stipulated price at which I had the option to keep all these stones of Heinemann; for they are next to my own in quality and far superior to those of Collection VI. But I had already made great financial sacrifices and declined to acquire this additional lot, only selecting the two specimens, Nos. 39 and 40. The best specimens that have got into other collections have come from this lot of George Heinemann of South Amana. Only two single specimens have been donated to me; all others I have paid for or returned to the owner, the Amana Society, or individual members of that Society. These two donations are quite remarkable.

I received both these specimens in August, 1875; both are shown in the photograph of Collection IV.; they are No. 30 and a scale of No. 33 shown in place at the right hand upper part of the figure.

These two specimens are specially prized. Number 30 is in many respects the finest, though in size next to the smallest (No. 32) of all collected; its surface markings are most instructive, showing fine lines and ridges of flow, which no halftone, even full size, could bring out.

When on July 21 I received the big stone at Amana through Mr. A. Noë it was not complete; a scale in the upper right corner was off, represented by the gray mass of the stone. As I had just given my receipt which also guaranteed that "said specimens shall not be injured or broken in any way while in my care," I naturally called attention to this fracture, the existence of which was well known. When afterwards I had group IV. photographed, the little present was put in place and the greatest stone that fell February 12, 1875, appears complete.

In the following I present a summary of the collections made by me according to person and property:—

Amana Meteorites According to Proprietors.

Hinrichs' Property:		Kilos.	
Coll. I, complete,	9 stones,	24.684	
" II, complete,	10 "	20.453	
" III, Nos. 20, 21, 23, 24;	4 "	17.506	
" IV, No. 30 and Frgmt. 33*;	2 "	0.561	
" V, Nos. 39, 40,	2 "	1.874	
" VI, No. 83	1 frgm't,	0.318	
Sherlock Stone, No. 0,	Frgmts.	0.465	
	27 stones, 2 frgmts.	65.861	65.861
Amana Society:			
Coll. III, No. 22; IV, 33;	2 stones,	54.250	
Members of Amana Society:			
Coll. III, Nos. 25 to 30; IV, 32,		1.608	
" V, all except Nos. 39, 40,		19.604	
		75.462	75.462
Collection VI (except No. 83),		61.215	
Sherlock Stone, main part,		1.953	
		62.808	62.808
Grand Total, Hinrichs' six collections,			204.131

In words, the above weights may be expressed by saying that I bought one-third of all meteorites found, that the Amana Society and its members retained another third, and that about one third was finally acquired by the Iowa University, but that all for a sufficiently long time were in my possession or custody for study.

Since now in the United States there were 1897, according to Wülfing: at Harvard, 17.4, at New Haven, 15.7; in hands of Bement, 10.2 and at Washington, 3.6; a total of 46.9 kilos; and since collection VI and the Heinemann stones returned by

me amount to 78.8 kilos; it follows that these two lots were sufficient to supply all in sight in the United States in 1897 and leave a balance of 31.9 kilos, more than sufficient to supply the specimens not accounted for by Wülfing's examination.

Hence it may be inferred that I have been able to acquire and obtain in trust for study and examination practically all the meteoric stones that have been collected after the great meteor of February 12, 1875. It does not appear that as much as 10 kilos escaped my search.

IV. THE METEORITE FIELD.

On our map (p. 8) every meteoric stone collected by me has been entered as accurately as possible in the place where it was found; no mark of any stone has been entered unless I have a stone in my collections answering thereto. Furthermore, each stone is represented as to weight by a symbol expressing that weight, as shown in the lower left corner of the map.

All stones for which I was able to obtain *the location where found* to my full satisfaction are designated on this map by the *number* of order in my list or catalogue; if no number is entered, it means that a stone of the specified weight was found and came into my hands for investigation, but that I was unable to determine the *precise locality* (section) in the field where the same was found.

I shall first give the list of stones reliably located according to *section* where found, specifying each stone by its *number* and here adding the weight in kilogrammes with *one* decimal only: —

Range.	Township.	Section.	Stones found.
IX	81	30	33–33.6; 22–21.1; 32 error on map.
"	"	32	20–5.8; 21–9.5; ? over 8.
X	80	1	34–4.2; 37–1.4.
IX	80	5	0–2.1.
"	"	6	2–3.8; 3–3.6; 35–4.2; 43–0.7; A.
"	"	7	6–2.3; 36–3.0; 40–0.7.

Range.	Township.	Section.	Stones found.
IX	80	8	1–4.7; 4–2.9; 5–2.6; 7–2.0; 8–1.8. 10–3.6; 12–3.0. J. Donaldson.
"	"	15	45–0.6.
"	"	16	32–0.06; 44–0.6; 47–0.3.
"	"	17	15–2.1.
"	"	18	38–1.4; 42–1.2.
"	"	19	39–1.1; 41–1.2.
"	"	21	31–0.1; 46–0.4.
"	"	28	48–0.4.
"	"	33	30–0.1.

IDENTIFICATION OF METEORITES.

At the point A on section 6 (T. 80, R. IX) a group of fragments was found seemingly parts of a larger stone having broken on striking the hard ground, according to the testimony of the farmer Espenlaub who owns the land. The fragments weighed 44 pounds (about 20 kilos), and found their way into our Collection VI.

The largest fragment, No. 73, weighing 7.614 kilos, is shown in the center of our plate, p. 21; the front shows continuous crust, the rear has no crust at all. It seems to have found its way into the Field Columbian Museum at Chicago (Cat. No. 313) the weight of which is said to be 7.626 kilos. The complete stone (Cat. No. 312) of the same Museum, weighing 3.175 is probably No. 57 of our Collection VI for which I found the weight in 1875 to be 3.168. Without comparison of the form, no positive affirmation can be made.

While we are about tracing some of these specimens we may state that the principal specimen of Amana Meteorites in the great Ward-Coonley Collection is apparently our No. 54, Coll. VI, weighing 5.398; for in Ward's Catalogue under No. 388 we find his largest specimen given a weight of 5.403, and his representations thereof (Plate IV, Fig. 6) looks exactly like our Collect. VI, No. 54; in Ward's figure the granular fracture is on top, the peculiarly pitted triangular face to the left.

These few examples show that even fragments of meteoric stones are quite individual entities that may be identified, and also, that the finest specimens of the Amana Meteorites now in diverse American collections have, no doubt, been examined by me while they formed part of one of my collections.

For the sake of completeness, I add the location according to the numerical order of the stones: —

No.	T.	R.	S.	¼	No.	T.	R.	S.	¼
1.	80	IX	8	SW	34.	80	X	1	NE
2.	"	"	6	SW	35.	"	IX	6	NE
3.	"	"	6	E half	36.	"	"	7	NE
4.	"	"	8	NW	37.	"	X	1	SE
5.	"	"	8	NW	38.	"	IX	18	NE
6.	"	"	7	NE	39.	"	"	19	N half
7.	"	"	8	SW	40.	"	"	7	NE
8.	"	"	8	SW	41.	"	"	19	NW
10.	"	"	8	SW	42.	"	"	18	—
12.	"	"	8	NE	43.	"	"	6	NE
15.	"	"	17	NW	44.	"	"	16	SW
20.	81	"	32	SE	45.	"	"	15	SW
21.	"	"	32	SE	46.	"	"	21	SW
22.	"	"	30	SE	47.	"	"	16	NW
33.	"	"	30	NW	48.	"	"	28	SW

We have thus been able to determine the section (and in most cases even the quarter section) where *thirty* of our 85 meteorites were found. This result we owe very largely to the intelligent assistance of our friends of the Amana Society.

AMANA METEORITE FIELD.

The *Amana Meteorite Field* forms accordingly an ellipsis seven miles long and three miles wide. The largest stones fell near the northern extremity, while the smallest stones fell in the southern half. The longer axis runs from NNW down towards the SSE See maps, page 8 and page 24.

It will be noticed that in the upper part of this field (sections 36, X and 31, 32, IX all T. 81) where the largest stones have

been found, the timbered river bottom formed a peculiarly unfavorable locality for the *finding* of meteorites. On thawing, the heavier stones might sink in the soft bottom land. We believe that heavy stones have fallen here but have escaped our search. We have guided such search by looking for broken limbs and bruised, torn barks of trees; also iron rods have been used as probes. Nothing has been found. Besides, no plowshare could here aid in detecting the meteorites, as it did in the cultivated fields.

FISH-TAIL AND FISH-TALE.

It is greatly to be regretted that scientific statements of *fact* are often too readily made and printed in scientific periodicals — and equally well accepted as established facts by modern authorities and used as a basis for generalization. For example, the Am. Jrl. of Science X, 357–363 for 1875, brings an article on the "Iowa *County* Meteor" and gives on a map (p. 361) a number of dots representing meteorites on Section 25 (T. 80, R. X), where no meteorites fell, and also three dots on Section 22 (T. 80, R. IX) *which sections are distant four miles;* on the same map these groups are separated by a broad space without meteorites. The entire meteorite field thus shown appears like a *fish-tail* in form. This *fish-tale* is accepted as true by the keeper of the meteorites of the British Museum, the distinguished mineralogist, *L. Fletcher*, in his learned discussion "On the Meteorites of Atacama," Min. Mag. VIII, p. 226. He enumerates ten meteorite fields of which four had a width less than three miles, one three miles wide, and one is four miles wide. This last one he names "*West Liberty*," and gives it a length of 7 miles by a breadth of *four* miles. For West Liberty the British Museum now correctly has Amana, and the exceptional width of the *four* miles wide meteorite field is reduced to three by dropping the meteorites of Section 25, T. 80, R. X, that never existed except in the imagination of the astronomer who in the title of his paper confined the great meteor to the narrow limits of a mere county.

LATITUDE AND LONGITUDE, WITH TORPITUDE.

To accommodate our European friends we will express the limits of the *Amana Meteorite Field* in latitude and longitude; on our American maps we commonly go more properly by the land-survey lines as explained above.* In the *lower* margin (page 8) we have represented the longitudes (in minutes) west of Greenwich, and in the right margin we have marked the latitude, north. It will appear from our map that this meteorite field extends from latitude 41 degrees, 41½ to 47½ minutes north, and from longitude 91 degrees west 52½ to 57½ minutes. The *focus*, if we so may call it, of the elliptical field marked by the heaviest stones is about latitude 41° 46 north and long. 91° 56 west. So much for the facts. Now let us look into the official catalogues of Europe and America.

The most elaborate and scientific catalogue of the great Vienna collection of Meteorites issued in 1885, by the learned director, Dr. A. Brezina, gives the location of our Amana meteorite field at 41° 53 N. and 91° 40 W., under the name of *Homestead*. This same location and name is repeated in the equally elaborate editionof 1895 by Brezina. The last edition, by the present director, Dr. F. Berwerth, gives the same location in latitude and longitude but under the name of *West Liberty*.

If the reader opens this little work at the pages 8–9, he can find the location of the above point in reference to our map of the Amana Meteorite Field on page 8 by erecting a perpendicular continuing the east line of Mitchell, Floyd and Butler Counties of the upper map page 9 and continue this perpendicular *a little over two inches* beyond the top rim of that map, so as to fall considerably more than one inch and a half beyond the edge of this

* Our European friends recording American meteorite localities do not understand that every farmer knows the exact location of his fields according to Section, Township and Range — but that latitude and longitude are in absolute inoccuous desuetude throughout our lands and among our people

page 9. A simple measurement, using the distance between section lines on page 8 as measure of a mile, will show that this location given in the official catalogues of Vienna in three consecutive editions lies over 12 miles east and over 7 miles north of the true center of our actual meteorite field stated by us above.

I have been greatly at a loss to account for this enormous error, but finally recognized that it originated in copying the latitude and longitude given by C. W. Irish at the opening of his "Account of the *Meteor*," as the place over which HE CONCLUDES that the main portion (as to light) of the *meteor* finally exploded; but *this more or less problematical point in the atmosphere* has no reference whatever to the *actual meteorite field*, which is related to the apparently smaller portion of the two into which the great meteor divided, as stated in our description.

The greatest meteorite collection in America is the Ward-Coonley Collection, of which the latest Catalogue (issued June, 1904) is before me. Since Dr. Brezina has greatly influenced this work, as shown in the catalogue, we find the localities given by latitude and longitude. On page 45 we find, under the trader's name *Homestead* the location 41° 39 N. and 91° 32 W. Since this point lies 24 minutes east and 7 minutes south of the true "focus" of the meteorite field, and on our map, p. 8, represents 10.6 inches east and 4.9 inches south, its falls nearly an inch beyond the right margin of the right hand page 9 and at a level two-thirds of an inch below the bottom line on page 9; *in fact, the place given by Ward has no reference whatever to the Meteorite Field in question* — for the latitude and longitude given in the Ward-Coonley Catalogue are those of the town Iowa City, Johnson Co., Iowa.

We may be pardoned for calling attention to the following sharply pointed words of Dr. Ward himself on page VIII of his catalogue just quoted from: "Foreigners * * * when noticing American meteorites * * * cause infinite confusion and mistakes. * * * Certain *foreign meteorite students* — *Museum directors* — * * * led them — not conversant with our geography — into infinite errors. These, fortunately, have *not* been perpetuated by being accepted in this country. A

"multitude of such cases, some of them quite startling, might "be instanced."

It would seem to me that a foreigner, not conversant with our American geography, would have a very poor chance to excel Dr. Ward in creating such confusion; being to the manor born, he has deftly thrown the entire Amana Meteorite Field twenty miles east and nearly eight miles south, so as to locate its center of gravity or focus in the campus of the University at Iowa City. That campus may have proved a source of meteorites to him as a dealer, but is in no sense a Meteorite Field.

After writing the above we concluded that a special map, actually showing these different locations, would be very desirable. We have constructed such a map and had it reduced to the limit of a page; it is inserted page 24.

By this map the most remarkable blunders and errors contained in official documents, *both foreign and American*, in reference to one of the most important and best explored meteorite fields of the world will, we hope, *be prevented from perpetuation* in the future.

V. NAME OF THE LOCALITY.

The great Meteor of February 12, 1875, was naturally well represented in the newspapers of the United States at the time. The same may be said in regard to the finding of the meteorites. But newspaper reports are not taken as evidence by serious scientists. How extravagant and ridiculous some reporters will state such matters may be exemplified by the following: —

NEWSPAPER SCIENCE.

"One of the meteorites fell in a field about three miles south of the village of *West Liberty*, having penetrated to the depth of fifteen feet into the ground." — *Dubuque Times.*

Now this statement is a gem, and so much so that it shows

what it is on its face, being palpably absurd both in geography and science. A friend sent me a clipping as a curiosity.

By turning to the lower (county's) map of page 9, West Liberty will be found in the northwestern part of Muscatine County, while the meteorites had all been gathered in Iowa County, 40 miles or 60 kilometers in a northwesterly direction from West Liberty. See also my new map, page 24. So much for geography; now as to the newspaper science:

The winter had been extremely severe, the ground in Iowa was frozen over three feet in depth; to say that a meteorite had penetrated such a ground to a depth of fifteen feet, is making it plain enough that the statement was never made to be taken seriously.

That American scientists have labeled the Amana Meteorites: "WEST LIBERTY, *Iowa County, Iowa*," is incredible, but unfortunately it is a fact. There is no West Liberty in Iowa County, and there never fell a meteorite at West Liberty, Muscatine County.

Notwithstanding all this, during the World's Fair in Saint Louis, 1904, in the Government Building we saw a splendidly executed map of the United States, elegantly mounted and exposed most conveniently to the throngs, surrounded by choice specimens of meteorites and big casts of the great meteorites of the National Museum at Washington,* and on this map *we saw a red star near the Town of West Liberty, Muscatine County, to indicate that a meteorite had been seen to fall near that town;* while *Iowa County*, where a hundred of choice and large meteorites actually had fallen, *was without such indicative mark.*

In this manner science is scandalized by our government institutions. This representation was in accord with the palpably absurd newspaper statement, and absolutely contradicted by the most widely known facts.

Strange to relate, this same ridiculously absurd newspaper statement also found its way into an English scientific publica-

* Professor Frank W. Clarke is curator of the Mineralogical Division which includes the meteorites.

tion, on page 77 of "A chapter in the history of meteorites, by Walter Flight,* D. Sc. Lond., F. R. S., with 7 plates and 6 wood cuts (Reprinted from the Geological Magazine). London, 1887. 8°. 224 pp."

The acceptance of so absurd a statement, qualified by Flight himself as "of a very sensational character" and referred by himself merely to a newspaper, constitutes indeed a remarkable "chapter in the history of meteorites." And it is just such of our modern professedly scientific writers who delight to hold up to public ridicule writers of long past centuries an account of their credulity.

That finally the public exhibition of our National Museum at the World's Fair at St. Louis puts this scientific humbug in grand style before the public in the very region where the meteor was seen and where thousands would know that there never fell a meteorite near West Liberty, shows that a government exhibition of costly objects of science may be successfully used to promulgate the most palpable errors of fact among the people.

Having regretfully seen how in modern days popular scientific writers do prefer to take their scientific data from "highly sensational" newspaper notes, and how great Government Exhibits popularize such fictions in the most attractive style, we will turn to the legitimate scientific publications of the time, such as the Comptes Rendus of the Academy of Sciences of Paris.

SCIENTIFIC PUBLICATIONS.

In the meeting (séance) of the Academy of Sciences of Paris, on Monday, May 3d, 1875, the member, *Berthelot*, recognized as one of the most prominent chemists of the world — read to the Academy a considerable portion of a letter from me on the subject of these meteorites. I shall here only copy such parts from the

* At his request by card from the Mineral Department of the British Museum, Aug. 4, 1875, we sent him special data and fine photographs as well as our description in the September number of *Popular Science Monthly*, for which he thanks by letter of Nov. 4, 1875. This aggravates the case.

published proceedings (Tome 80, p. 1175) as pertain to the locality of the meteorites in question. It must also be remembered that this great Academy has always observed the very important rule to issue the proceedings of each meeting latest by the time of the next *weekly* meeting, so that what was read on May 3, 1875, by Berthelot from my letter, as well as the commendation spoken by Daubrée at that meeting, *was published* and sent abroad throughout the scientific world latest on May 10, 1875.

"The fall of meteorites in Iowa County, of the State of Iowa, "on February 12, 1875, can only be compared with the great "falls of Knyahinya (1866), Orgueil (1864) and L'Aigle "(1803). Up to the present instant many stones and fragments "have already been gathered in Iowa Township of the above "named county. * * * The specimen which I sent for the "Museum with the present letter, is most perfeet, with a com- "plete crust. * * * It appears to belong to the group of "*Oligosideres* of the *Sporadosideres* according to the classifica- "tion of Mr. Daubrée. * * * "

"At the close of this communication, Mr. Daubrée states that "the meteorite sent has been very correctly classified by Professor "Hinrichs." * * *

"Mr. Daubrée asks permission to offer, in behalf of the Mu- "seum, the expression of his sincere thanks for the entirely spon- "taneous act of generosity by which Monsieur Hinrichs has "enriched the collection of meteorites of this establishment."

This is the *first scientific publication* of the great stone-fall in Iowa County on February 12, 1875. It is given to the scientific world in a session of the Academy of Sciences of Paris, by the distinguished chemist *Berthelot* reading from my letter and presenting one of the very objects, the fine stone No. 1, weighing 4.65 kilos (10 lbs. 4 oz.) shown at the top in our Collection I. (page 6); the exact location is given, not only by the county, but even by the township in that county; and finally, the stone is fully described by referring it to the division of meteorites to which it belongs.

The highest then living authority on meteorites, *Daubrée*, after this presentation by *Berthelot*, rises in the meeting and declares

this description to be correct. Finally, these proceedings in the meeting of the French Academy of Sciences at Paris on May 3, 1875, are published in the Comptes Rendus for this meeting, issued in quarto and mailed on May 10, 1875.

This constitutes as complete a scientific publication of any meteorite fall as can be desired. The chemical analysis of a meteorite is entirely secondary to its proper classification, was not given at this time, but soon after; it is simply a matter of routine.

TRUE NAME OF THE LOCALITY.

While the general name of stone-falls in the United States consists of the name of the *county* (in this case Iowa County), it is desirable also to indicate the precise locality in the county by a single word, as is the custom in Europe.

There are several good reasons for this method. First, our counties cover so large a territory that they may receive more than one stone-fall; this has actually happened for "Iowa County, Iowa," when on March 27, 1894, meteoric matter fell at and about "*Marengo*, Iowa Co., Iowa."

The local specification already used by me in my communication read in the Academy on May 3, 1875, was the best attainable at the time. But we found soon after that the meteorites were not restricted to *Iowa Township*; for the largest fell in *Amana Township*, just north of Iowa Township. These large stones had not yet been found when I wrote my letter to *Berthelot* about the middle of April; in fact, they were not found till about the close of June.

Besides, township names are not much known outside of their own territory, and in this particular instance, the monotony of the full designation would be detestable. To say these meteorites fell in "*Iowa* Township, in *Iowa* County, in the State of "*Iowa*, on the banks of the *Iowa* River, about twenty miles west "of *Iowa* City," would be unpardonable in language.

The specific locality name required was in no other case as plainly determined by the facts and circumstances as in this instance. The greatest stones fell on land of the Amana Society; fully half of all stones were gathered by members of the Amana

Society and by them intrusted to me for study, when they could not be bought; *the whole meteorite field* (see map 8) *is flanked by the Amana Villages; closely by their five villages:* South-, West-, Höhe-, Middle-Amana and Homestead, with Amana and East-Amana a little more distant to the northeast.

As soon as the meteorite field was fully determined (that is about the first half of July, 1875) the proper specific name of this great meteorite field was clearly indicated as AMANA, *Iowa County*, Iowa.

PROMULGATION AND ADOPTION OF THE TRUE NAME.

This name was used in my correspondence during the summer and publicly announced by *Daubreé* in the session of the Academy of Sciences of November 29, 1875, as published in the Comptes Rendus, Tome 81, p. 1025; a fac-simile of this publication is printed on page 17 of this work. I will translate the last clause thereof here: —

"On this occasion, Professor Hinrichs expresses the request "that the fall of February 12 last be hereafter not designated by "the name of *Iowa County* which may lead to confusion, but by "that of *Amana*, which is the name of a community in which "many of the specimens have fallen and which its inhabitants "have disinterestedly parted with."

This declaration is as nearly exact as the few words used can make it. We have above in detail stated that these valuable specimens were not *given* away, but temporarily parted with to make them available for scientific study.

Since now I had given the first scientific publications and furnished splendid specimens to twelve institutions in Europe, and here through friends and self to American institutions; I was scientifically authorized to name this fall, and after the name was published by *Daubrée* the name *Amana* was properly established.

This name Amana was used by *Daubrée* in his correspondence (see fac-simile of his letter, page 12), and in his scientific publications, for example: Comptes Rendus, T. 82, p. 950; 1876. He also used it in the manuscript annotations to the Meteorite Collection at Paris, of which I have a copy. Professor Gustav

Tschermak, in charge of the great meteorite collection of Vienna, uses this same designation in his official catalogue published 1877 in the Mineralogische Mittheilungen, p. 309–310.

It must be borne in mind, that the specific name thus adopted is *Amana;* this must be followed by *County*, *State* and *Country*, making the *full* name:

"AMANA, Iowa County, Iowa, U. S."

That this properly chosen and scientifically fully established name has, for some time, been arbitrarily set aside has led to much confusion; but by the action of the directors of all great meteorite collections of Europe, the above name has been definitely adopted. As example we show on page 16 the fac-simile of the label designating the meteorite No. 11, presented by me to the Academy of Sciences of St. Petersburg for the Mineralogical museum of that Academy in 1875.

FALSE LOCALITIES.

How necessary it was to end this state of confusion may be seen from the labels that have been used in the great collections at Paris and Vienna — *in both of which by their directors Daubrée and Tschermak the true name* AMANA *was originally used* as shown above. The reference given is to the official descriptive catalogue of the years specified.

PARIS, 1882, p. 28, by Stanislas *Meunier:*
West Liberty, *Iowa Township*, *Amana*, *Iowa County*, Etats-Unis (i. e. U. S.).
" 1898, p. 84:
Iowa Township, Homestead, West-Liberty, Amana, Sherlock, Iowa County, Iowa, U. S.

VIENNA, 1885, p. 241, by Dr. *Brezina:*
Homestead, Amana, Sherl., Jowa, U. S.
" 1895, p. 304:
Homestead, Amana, Sherlok, Jowa, U. S.
" 1902, p. 39, by Dr. *Berwerth:*
West Liberty, Homestead, Amana, Sherlok, West Liberty, Jowa, Verein, Staat (i. e., U. S.).

For these three locations, the geographical co-ordinates are given: Lat. 41° 53 N., Long. 91° 40 W.

To fully appreciate this geographical muddle, we have constructed the map printed on page 24. We will only repeat that "*West Liberty*" comes from the newspaper hoax, and "*Homestead*" from Brezina's endeavor to coin new locations, aiming to hit the *nearest town* — an attempt the absurdity of which equals its foolhardiness, and which has been most completely shown up and set aside by his own successor in office, Dr. F. Berwerth, on pages 2 and 3 of the catalogue of the Vienna Collection of 1902. It was also set aside by *Wülfing* in his great work of 1897 on the Meteorites in Collections. To this map we will only add the following remarks:—

First, no one seems to understand, that the term "Sherlock" designates only *one single stone*, the first one found, only three days after the fall. Compare p. 42.

Second. We see at Paris a change from *Amana* used by its director Daubrée to West Liberty (1882) to *Iowa Township* (1898) in the two consecutive editions.

Third. At Vienna we find that Brezina abolished the true name used by his predecessor *Tschermak* and located his *Homestead* in 1885 and 1895 in *Township* 82, Range VII, *Linn Co.*, at the top of our map, page 24, where Berwerth in 1902 places *West Liberty*; the first is really *16* miles southwest, the second *30* miles southeast from this point marked on our map, p. 24, in the latitude and longitude given by Brezina and repeated by Berwerth.

The author specially requests every reader of this book on the Amana Meteorites to notice the *five* large crosses on map, p. 24, given by our modern authors as the true location of these meteorites. Since these meteorites actually were found in *one* locality only, marked by our cross just south of Höhe-Amana and east of West-Amana, the other *four* crosses mark only imaginary localities. Such is Fact and Fancy in Modern Science.

We ought to add, that the cross in Linn County marks almost exactly the spot where the HARTFORD, *Linn County*, Iowa, Meteorite of February 2, 1847, fell. But for this location the above Vienna scientists give the co-ordinates 41° 58 N. and 91° 57 W., which

throws it out of Linn Co. into Benton Co., and into Township 83, Range X, nearly 20 miles west and about 6 miles north of their Homestead — West Liberty geographical fiction.

Thus a future critic might identify the falls of 1847 and 1875, or totally obliterate the learned geographical notations of Brezina, Berwerth and — Ward.

Fourth. Homestead is anyway *not* the nearest town to the actual meteorite field: the three towns, South-Amana, Höhe-Amana and Middle-Amana, are each one nearer to that locality, and especially nearer to that part of the field where the larger stones fell.

In America, Dr. H. A. Ward, the founder of the great commercial house at Rochester, N. Y., known as "Ward's Natural Science Establishment" adopted Brezina's name of Homestead, which is also the name of the meteorite trading post during the summer of 1875; he has also carried the name of West Liberty (catalogue 1892, p. 34) but now, in his catalogue of the Ward-Coonley Collection (1904, p. 45) repeats Brezina's Homestead, which in the mean time has been obliterated at Vienna where it was first invented.

Again following in the footsteps of Brezina, Dr. Ward gives the geographical co-ordinates of the locations. He gives in the place just cited 41° 39 N. and 91° 32 W. for Homestead. A glance at our map, p. 24, shows that these co-ordinates belong to Iowa City, some twenty miles east of Homestead.

The National Museum at Washington in its official catalogue of 1902 (from the Report of the United States National Museum for 1900, page 671–698 with three plates) gives on page 685 *Homestead* (West Liberty), Iowa County, Iowa, but on its great map at the World's Fair in St. Louis, 1904, the *red star mark* designating a meteorite fall *seen* was placed at West Liberty, Muscatine Co., and no meteorite mark of any kind was shown in or near Iowa County.

So far as Dr. Ward is concerned, I beg permission to say that I called his attention to this muddle in a private letter of February 12, 1900. In his reply of Feb. 20 he says: "As to West "Liberty I cry peccavi, although my sin has been in common

" with others whose shoe-lockets I am not worthy to loose
" * * * I regret that I should in my present catalogue per-
" petuate the *West Liberty which I now see is absurd.*"

Again, Febr. 23, 1905, I requested Dr. Ward to conform in the future to the established scientific name for the fall of February 12, 1875. My letter was forwarded to him and from Rio de Janeiro, Brazil, May 1, 1905 he AGREES *that this fall should be called Amana* — but REGRETS that it is impossible to " change the name Homestead " used continuously thus far.

This statement is obviously contrary to fact, as will be seen by the above references to the catalogues of Vienna and Paris; in fact, Brezina's name Homestead has been changed in 1902 at Vienna, where it was arbitrarily coined, and as a matter of fact the directors seem to have been changing the name of this fall continuously.

The record of this muddle is neither pleasant nor creditable to our present scientific advancement; but we had to clear it up by stating the facts to speak for themselves. I am very grateful to the gentlemen now in charge of the great Collections of Meteorites who have cordially assisted me in this work, which I trust will make it impossible in the future again to disturb the regularly established and scientifically correct name of the meteorites due to the great Meteor of February 12, 1875, namely

" AMANA, Iowa County, Iowa, U. S."

VI. DISTRIBUTION OF THE AMANA METEORITES.

" Meteorites are of the highest scientific importance, for they
" constitute the only cosmical material accessible to chemists so
" that they can submit the same to tests in the laboratories.
" When the great meteor of February 12, 1875, projected on
" Iowa County a considerable number of meteoric stones within
" a distance of about thirty kilometers (20 miles) from my
" dwelling at that time, I felt it my duty to collect this cosmical
" material as completely as possible for the use of scientific in-

"stitutions and especially those of Europe." These are the opening words of my *Note* on the Amana Meteorites, presented by *Berthelot* at the session of the Academy of Sciences of Paris on February 20, 1905, and published in the Comptes Rendus of that Academy, Tome 140, p. 545, almost to a day thirty years after the fall of these meteorites.

The collection of this cosmical material has been sketched in the preceding parts of this history of the Amana meteorites; we shall now give a brief account of the distribution thereof.

PREPARATORY STUDIES.

In my scientific life work on the unity of matter, the positive evidence furnished by the meteorites of the existence of the chemical elements in the world beyond our earth* was recognized by me from the start; this also accounts for placing the ancient symbol of the unity of matter upon the cover of this book.

The first special instruction on actual meteorites I received in connection with a noted public lecture by Professor Forchhammer, which he demonstrated by specimens from the collection of meteorites of the University of Copenhagen. I also made the personal acquaintance of Buchner † while he was at Copenhagen getting data for his book ‡ on "The Meteorites in Collections," the first work of this kind.

In the sixties I was deeply interested in the researches of Haidinger, printed in the Sitzungsberichte of the Academy of Vienna and those of Daubrée given in the Comptes Rendus; the first were especially important on the attending phenomena of the meteorite falls, the latter on the composition and the possible synthesis of the meteorites themselves.

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* Berzelius, Jahrbuch XV, p. 227 (for 1834). A. Humboldt, Kosmos, I, 142; 1845.

† Christian Ludwig *Otto Buchner*, born May 22, 1828, at Darmstadt, died February 6, 1897, at Giessen, Germany.

‡ Die Meteoriten in Sammlungen, Leipzig, 1863. XXVI, 202 pp. 8vo. This is the first book on that subject.

With Haidinger I had corresponded since 1856, and especially during the last years of his life; with Daubrée I became acquainted through the Amana meteorites.

When therefore in 1873 I made a scientific journey through Central Europe, I gave special attention to the great Collections of Meteorites in London (British Museum), Paris (Museum d'Histoire Naturelle at the Jardin des Plantes) and Vienna (Naturhistorisches Hof-Museum), then respectively in charge of Maskelyne, Daubrée and Tschermak. I became thereby convinced that any meteorite coming my way would be best placed for permanent good to science in these grand collections.

It is upon the knowledge thus obtained that I based the distribution of my meteorites in 1875. The plates, pages 6 and 7, show each specimen and its destination. At that time, now thirty years past, it seemed to me the most simple and natural thing in the world to do just what I did in collecting and delivering absolutely free of cost these fine specimens of meteorites to the dozen institutions specified. It is only upon more extended research in records not readily accessible and not connectedly published that I find my action was without precedent.* I may therefore be permitted to quote the following from a prominent chemist who had received a copy of the 16 pages plates of this work: —

"Beim Anblick der Abbildungen Ihrer grossartigen Meteoriten sammlung weiss man nicht, was man mehr bewundern soll, die Reichhaltigkeit der Collectionen und die Grösse der einzelnen Exemplare, oder Ihre Liberalität, mit der Sie wissenschaftlichen Sammlungen von Ihren Schätzen mitgetheilt haben." †

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* The distribution of $\frac{1}{10}$ of the 166 kilos of Ngawi, Java, by the government in pieces of 400 grammes (Brezina, Notizen, Annalen Hofmuseum II, 1887) and the liberal distribution of the Braunau Iron of 1847 by the Abbot Rotter of the cloister at Braunau are the only two instances that might be mentioned at all (Rose, Meteoriten, 1864, p. 34 and Wülfing, 1875, p. 45).

† In looking at the pictures of your grand collection of meteorites one hardly knows what to admire the most, the extent of the collections and the magnitude of the several specimens, or the liberality you have shown in giving of your treasures to scientific institutions.

Expressions like this must be allowed to offset the vexatious work that was required to restore the very name of the locality and its *one* single place upon the face of the earth.

SHIPMENTS OF METEORITES.

The first shipment of meteorites was made as early as April 19, 1875, through the importing booksellers B. Westermann and Co., of New York (now Lemcke & Buechner) who contracted to deliver each specimen at destination without any charge to the recipients. Having carefully taken the three linear dimensions of each specimen, I had a neat box made exactly fitting for each; with a little packing, the specimens arrived at their destination in perfect condition.* A second shipment was made on May 3. Fortunately, none of these shipments were on the fated steamer that struck the rocks at the Scilly Islands near Cornwall, England, about that time.

On pages 10 to 14 a few of the many documents received in return are presented in the original, full size (p. 13, 14) or greatly reduced (pp. 10, 11). We shall present some of the points of general interest. The offer of a decoration was given no consideration by me, a Ditmarsian.

PARIS, France, for the Museum, through *Berthelot* of the Academy of Sciences.

> Meteorite No. 1, weight 4.650 and No. 15, weight 2.142 kilos; also two fragments of Sherlock Stone 100 and 37 grammes; total weight 6.929 kilos or almost 7 kilogrammes.

Acknowledged in session of the Academy on May 3 and Nov. 29, 1875, as specially stated above (p. 60, 63) and constituting the first scientific publication of the fall, its general (Iowa County) and specific (Amana) name. See Comptes Rendus T. 80 and 81; also facsimile p. 17.

The letter of Daubrée (p. 12) is added to show that he uses

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* The box for No. 11 going to Petersburg had the inside dimensions 7 by 5 by 4½ inches; that for No. 15 going to Paris was 5¾ by 5¾ by 3 inches in the clear. These values show the linear dimensions very well.

the name Amana; it begins as follows: "Monsieur Berthelot has delivered to me the interesting and beautiful *Meteorite of Amana* which you had the kindness to present to the Museum." These donations were officially acknowledged by the Museum — under the signature of the famous Chevreul, then 89 years old. Two years before, I enjoyed the great honor of a conversation with this Nestor of the chemists of the world, in his own laboratory at the Jardin des Plantes. I also heard him address the Academy of Sciences during my stay at Paris.* The formal thanks of the Minister of Public Instruction of France are shown in reduced (½) fac-simile on page 11.

This famous museum has also received from me *two* other *new meteorites* in 1894, namely: *Marengo*, 1894, and my *White Crust* of 1892. The first is recorded in the catalogue of 1902 as No. 450, without indicating its donor and investigator; the second is described in Comptes Rendus, T. 118, p. 1418; 1894. I also gave its director (then Daubrée) the first notice of the Estherville meteorite, Comptes Rendus, T. 88, p. 1219; 1879.

LONDON, *England*, for the British Museum.

Meteorite No. 2, weight 3.793 kilos; also two fragments of the Sherlock Stone, 30 and 51 grammes; total weight 3.874 kilogrammes.

The keeper of the minerals, Nevil S. Maskelyne, thanked me by letter of May 19, 1875, of which fac-simile on page 13 is a most important recognition; it reads: —

"You have done a good deed for science in rescuing the "specimens you have collected, from the greedy maw of the "dealers."

I may also quote the following from his letter of June 7, 1875: —

"Your really handsome stone from the Iowa fall has arrived "here in safety and I have been admiring it and thanking you in "my heart for sending it. It is a *fine* specimen."

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* Michael Eugene Chevreul, born Aug. 31, 1786, at Angers, died April 8, 1889, at Paris, at the age of 103 years. His work on the chemical constitution of the natural fats was fundamental in organic chemistry.

He asked "the Olympian personages who are Trustees of the British Museum to sanction" sending me "a series of small duplicates of such falls as I think you may not perhaps get elsewhere" and hopes "that they will nevertheless give gratification" to me.

In fact, these specimens are the finest of the few I received, namely from London, Paris, Harlem and Stockholm.

The successor to Maskelyne in the high office of Keeper of the Minerals of the British Museum, the distinguished crystallographer, L. Fletcher, favored me with a copy of the card I sent with the above specimen No. 2, which card may be of general interest, especially as practically the same information was sent in about the same form with each of the specimens presented:—

"Herewith a box containing a meteorite which fell February "12, 1875, in Iowa County, Iowa, U. S.: present to the British "Museum, care of Prof. Maskelyne. GUSTAVUS HINRICHS.

"April 19, '75.

"Free of Duty."

This card contains all information necessary to properly label that specimen; all that was then reliably known, and published in the Comptes Rendus for May 3, 1875.

As stated in a preceding chapter in detail, the *special* location in the county was firmly established in June and July, communicated through Daubrée in the Comptes Rendus for November 29, 1875, as *Amana*. For the scientific world, since that day, the only legitimate name of this fall or location has been "Amana, Iowa County, Iowa, U. S."

VIENNA, *Austria*, for the Naturhistorische Hof-Museum.

Meteorite No. 4, weight 2.856 kilos, and 24 grammes of Sherlock Stone, total weight 2.880 kilogrammes.

Professor Gustav Tschermak, successor to Haidinger in charge of the splendid Meteorite Collection of this great Museum, says in his letter of June 22, 1822:—

"* * * the meteorite received to-day. Permit me to 'express to you my heartfelt thanks for this extraordinarily "valuable present. You have by this donation to our Collection

"enriched the same to so important an extent* that all those who "now use or later will use this Collection are under the greatest "obligations to you.

"The specimen kindly sent is so excellently preserved that it "is a joy to me."

Professor Tschermak expresses also the desire to receive a small specimen for further examination, as he naturally would not like to injure this fine specimen; in reply hereto, I sent him the above 24 grammes of the rare Sherlock Stone, which of course for such purpose was preferable, not having been seriously exposed to the weather. In a letter of July 20 he thanks for this additional favor, and says:—

"You have taken this latest meteorite fall in such an energetic "manner in hand that I doubt not you will also in the future "with like interest take hold of the gathering of meteorites. If "you thus will assist our institution * * * it will be of in-"calculable value."

In one of my letters I offered to furnish a good specimen for a systematic exploration by sawing into sections, knowing that the institution under the direction of Professor Tschermak was provided with appliances for such work; this I conditioned on largely controlling the final distribution of the sections to institutions having received complete stones from me; the Vienna institution would have full time for first investigations of all the sections made. This offer was promptly accepted by Tschermak — but in the meanwhile the "dealers" pleasantly referred to by Maskelyne of London had made it so decidedly unpleasant for me at Iowa City and in the University that I did not feel like going any further in this direction.

In fact, the letter of Professor Tschermak of September 6, really completed the evidence we already had, namely that a certain prominent chemist of Kentucky, who had analyzed a great number of meteorites and obtained quite a collection by barter, was in some way back of this personal fight upon me which had

* Unserer Sammlung eine so wichtige Bereicherung zugeführt dass Ihnen alle Jene zum grössten Danke verpflichtet sind welche die Sammlung benützen und noch benützen werden.

been pushed even into the Board of Regents of the University. On page 14 I have given a fac-simile of this part of Professor Tschermak's letter of September 6, 1875. On page 15, facing this fac-simile, I have inserted the reduced copy of the case finally brought into our courts, against the Amana Society and myself as defendants.

The plain farmer, Henry Maas, in whose name suit was brought, had apparently no great interest in the same and was not able to spend much money in that way "for celestial dornicks," as the people called these meteorites. When the case came finally to trial, the chief testimony about the extraordinary money value of the meteorite in question was given by the local astronomer who had no such personal knowledge of his own but was intimately associated with the chemist referred to.

By the fac-simile of Tschermuk's letter of September 6, 1875, printed on page 14, it is established that already in August, 1875, *J. L. Smith had offered the greatest stone* (No. 33), the property of the Amana Society, and intrusted to me against my receipt and guarantee, *for an equal weight of different meteorites of the Vienna Collection!*

The importance of this matter requires that I insert a translation of the passage printed on page 14:—

Vienna, 75, Sept. 6.

"* * * I have already heard from Smith about the two "great pieces of 33 and 21 kilos.* I would very much like to "acquire such a large specimen if it could be obtained for any "reasonable sum; but I could not accept *the offer of Smith* and "give in exchange an equal weight of the different meteorites "of the Vienna Collection. I would thereby damage our beau-"tiful collection too much."

This very legitimate testimony came to hand at the proper time, when the parties concerned had been working even in the Board of Regents of the University.

The lawsuit resulting began with a search visit of the sheriff

* That is my No. 33 and 22 of Collections IV, and III, shown pp. 18 and 19.

of Johnson County to my laboratory for the stone No. 33 which Smith had offered to Tschermak, but which was intrusted to me by the owner, the Amana Society.

Since the sheriff failed to find that stone, we were liable for its value, claimed to be — its weight in gold! We shall return to this subject.

BERLIN, *Germany*. Meteoriten Sammlung der Universität.
Meteorite No. 6; weight 2.274 kilogrammes.

Since 1860 I had, at long intervals, exchanged letters and short notes with the eminent scientist E. du Bois-Reymond of Berlin; hence I sent the meteorite intended for the comparatively small Collection made famous by its big men (Chladni, Klaproth and Rose) to du Bois-Reymond, who had become the presiding Secretary of the Academy.

I received a most cordial letter of thanks from Professor Websky in charge of that collection, under date of June 22, 1875, and later, the formal thanks of the Royal Academy of Sciences of July 6, dictated and signed by the presiding secretary du Bois-Reymond, a document which I justly prize higher than any other received in that meteorite year of 1875. I have therefore inserted a fac-simile thereof (half natural size) on page 10 and venture the following translation of that document characteristic of the kindly-profound secretary:—

"By direction of the Royal Academy of Sciences it is my pleasant duty to express to you the heartiest thanks for the extraordinary attention, the rare zeal and the self-sacrificing disinterestedness which you have displayed in enriching our public Collections with so valuable a specimen of the great fall of Meteoric Stones of Iowa County.

"Messrs. Beyrich, Roth and Websky, who now jointly have the Mineralogical Museum in charge, Mr. Dove, Mr. Ewald and Mr. Rammelsberg, who in the Academy are specially interested in meteorites, have manifested their most marked joy about your donation, and it has only been regretted that Gustav Rose, who till his death studied meteorites with enthusiasm, was no longer with us to take part in this rejoicing."

I trust that this necessarily crude rendition of the elegant letter of du Bois-Reymond will convey to those unable to enjoy the original an idea of the really remarkable compliment passing over the head of the eminent men in charge, to the spirit of the great founder of the scientific classification of meteoric stones.

When Dr. Ward claims to use the classification of Brezina, we know the latter merely slightly modified the notation of Tschermak who professedly simply tried to express the criteria established by Rose in symbols.*

But what a contrast between men of Berlin! In 1856 I intrusted papers to the care of Secretary Krönig of the Physical Society of Berlin, including the general relation now named after Van der Waals, and also giving the *atomic numbers* of the elements; the latter were, in the sixties, published by Krönig as "his" atomic weights.† Again, in 1872 and 1873, the German chemical society, through H. Kopp and A. Naumann, made it necessary for me in 1874 to demand the striking of my name from the list of membership where it had been placed in 1870 through Hoffman.‡

In the meanwhile, my dynamics of the three states of aggregation had been published by the Academy of Sciences of Paris, through Berthelot and Bertrand.

The Berlin Collection of Meteorites is now in the able and energetic hands of Professor Karl Klein of the University of Berlin.

ST. PETERSBURG, *Russia.* Mineralogical Museum of the Imperial Academy of Sciences.

Meteorite No. 11, weight 3.268 kilogrammes.

This very fine and large specimen shown at the top of Collection II on page 7 was sent in care of Professor Kokscharow§

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* Die Meteoriten des K. K. Mineralogischen Museums am 1 October 1872, pp. 1, 2.

† Absolute Atomic Weights, 1901, p. 290. Atomechanik, 1867, p. 3.

‡ Beitraege, Fock, Leipzig, 1892, p. 24.

§ Nikolai Iwanowitsch Kokscharow, born Nov. 23, 1818, at Tomsk, Siberia, died Jan'y 3, 1893, at St. Petersburg, Russia.

whose crystallographic works were familiar to me, and have been largely drawn upon in several of my later books.* But no answer of any kind was received. However, the work of Wülfing (1897, p. 146) shows that my meteorite reached its destination all right, and that it is the only specimen of Amana Meteorite in that great collection; weight stated 3262 grammes.

On inquiries made June, 1904, I was informed through Professor Alexander Petrovitch Karpinsky that the "magnificent meteorite" is in the museum, and that the proceedings for 1875 give all proper information about the presentation; and incidentally, characterizing the long interval of time elapsed, by stating that only *two* of the members of the Academy at 1875 are still alive!

On November 3, 1904, Professor Karpinsky writes: —

"The Imperial Academy of Sciences at St. Petersburg expresses to you once more its profound gratitude for the beautiful specimen of the Amana Meteorites, which is the ornament of its collection of Meteorites."

The "once more" indicates that the proceedings show such expression made in 1875, of which notice was addressed to me but failed to reach me. I further received the actual labels of the specimen, of which full size fac-simile is printed on page 16.

I regret to say that a number of other sendings of which I have been advised, have failed to reach me by mail from Russia.

COPENHAGEN, *Denmark*, to the Mineralogical Museum of the University, through the Academy of Sciences.

Meteorite No. 5, weight 2.634 kilogrammes.

The secretary of the academy, Japetus Steenstrup, was personally known to me; he was successor to Forchhammer in that position, now filled by the eminent mathematician, H. G. Zeuthen.

The present mineralogist in charge of the meteorites is Professor N. V. Ussing, who recently made known the most remarkable new mineral cryolithionite associated with the cryotith in Greenland.

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* General Chemistry, 1897, pp. 56–64 and 111. Introd. to Cryst. Chem. 1903, pp. 33–37.

The Amana Meteorite presented by me is larger than any other meteoric stone in this collection, excepting that of Mern which fell near Praestoe in Denmark itself.

CHRISTIANIA, *Norway*, Kgl. Norsk Universitet.

Meteorite No. 7, weight 2.040 kilogrammes.

The collection was in charge of Professor Th. Kjerulf at that time; now Prof. W. C. Broegger manages the same.

STOCKHOLM, *Sweden*, Riksmuseet, through Kgl. Vetenskaps Akademien.

Meteorite No. 8, weight 1.819 kilogrammes.

This collection of meteorites is the largest in Skandinavia and one of the most important next to the three great collections of Europe. In 1884 Lindstroem enumerated 101 Stones and 80 Irons. The collection is now in charge of Dr. Hjalmar Sjoegren.

MUNICH, *Bavaria*, Germany.— Academy of Sciences.

Meteorite No. 16, weight 1.545 kilogrammes.

The noted mineralogist — and poet — Franz von Kobell, officially as secretary of the Academy, under date of November 7, expressed the thanks of the Academy. Professor C. W. Guembel published in the Sitzungsberichte of this academy a description, with chemical analysis and microscopic examination of this specimen (Band 5, p. 313). It is a rather curious fact that in the history of the fall he refers to a number of persons who had at best a commercial interest in the meteorites; but he seems not to know that I had anything whatever to do with these meteorites nor that the material in his hands had been donated by me through his academy to his museum. Newspaper science appears sometimes more palatable than the Comptes Rendus. — After repeated inquiries I ascertained that the fine specimen is in the Museum of Bavaria at Munich.

BRUSSELS, *Belgium*. Academy of Sciences.

Meteorite No. 13. Weight 2.663 kilogrammes.

The meteorite was presented at the meeting on August 7, 1875, and official thanks were returned by the secretary on August 10.

At the meeting of February 2, 1905, Professor G. Dewalque (of Liege), as member of a special committee, made a formal report on this meteorite, which report (4 pages) is printed in the Bulletin for that meeting. The meteorite is in the Museum Royal d'Histoire Naturelle at Brussels.

I am very much obliged to Professor Dewalque who has taken much interest in meteorites and recently issued a most valuable catalogue of the meteorites in different collections of Belgium.

LAUSANNE, *Switzerland:* Société Vaudoise for the Musée geologique.

Meteorite No. 9, weight 997 grammes.

Sent through L. Dufour, acknowledged thanks by President E. Renevier of Nov. 18, 1875. A translation of my paper in *Popular Science Monthly* for September, 1875, made by H. Goll, was printed in the Bulletin of the Society, Vol. XIV., p. 576–584, in March, 1877.

Through Professor M. Lugeon, who lately has described a new Swiss Meteorite, we have recent information from meteorite No. 9 which is preserved in a special case in the museum named above.

HARLEM, *Holland*, Hollandsch. Maatschappij.

Meteorite No. 14. Weight 2.464 kilogrammes.

My sending was made through the Secretary, Professor E. H. v. Baumhauer. He answered that the society had no meteorite collection; which was still true in 1897 according to Bosscha's Report to Wülfing (Met. in Samml., p. 416). In this way the meteorite came into the private collection of Baumhauer, who sent me a good specimen of Utrecht and of Cape of Good Hope. When about 1885 the Baumhauer Collection was sold, through B. Stuertz of Bonn, to

BUDAPEST, *Hungary*,

this meteorite became the property of the Hungarian National Museum where, according to Director Krenner, the specimen is now.

This is the only instance in which the meteorite has not reached its intended destination; but since the Collection of Budapest has rapidly outgrown many other European Collections, I suppose

it is in very favorable surroundings to assist many persons in the study of meteorites.

Another fate seems to have befallen that large and excellent meteorite No. 20 which I presented to an American institution; it seems to have disappeared.

It was my intention to present a reasonably complete account of the *present* location of all Amana meteorites throughout the civilized world. After much work and correspondence I find that this cannot be done at present.

I therefore add the following table as the best that has been found practicable in this direction. It is based upon the results obtained by *Wülfing* and printed on page 146 of his very meritorious work on "The Meteorites in Collections, Tübingen, 1897, XLVI, and 460 pp. 8vo, supplemented by my own information. As he seems to ignore my work in this field, he sums up only 124.5 kilos, which is 80 kilos short of what I alone have collected. We will add that the three large collections in America are: New Haven 35.7, Harvard 17.4 and Washington 3.6, while the three large private collections are those of Ward 12.6, Bement 10.2 and von Braun 1.5. It will be noticed that the Amana Meteorites are now found in about 70 collections.

PRESENT DISTRIBUTION OF THE AMANA METEORITES
throughout the World.

		Totals, kilos.
AMANA SOCIETY, deposited No. 33 and remains of No. 22, about 47; members have, abt. 3		50.0
HINRICHS retains stones, and Frgmts. 7 and 2	20.38	
presented to Europ. Instit. 13 and 3	34.37	
" to American 4 " 2	12.05	66.8
PUBLIC COLLECTIONS, in *Europe*:		
6 have added to Hinrichs' presents	4.72	
10 small collections	3.71	
14 minor "	.50	8.93
in *America*:		
3 large collections	56.70	
3 small "	.95	57.65 66.6

PRIVATE COLLECTIONS,		
3 large collections	24.23	
7 small "	2.02	
8 minor "	.04	26.3
	Sum	209.7
	Total collected by Hinrichs	204.1
		5.6

VII. THE BIG AMANA METEORITES.

A very careful study of all records accessible to me has convinced me that a meteoric stone weighing 9 kilogrammes or about 20 pounds must properly be called a *big* one. In this study I greatly regret that it was impossible to use the data given by the British Museum — the only one failing to specify the weight of the largest single specimen, and giving merely the aggregate weight of all specimens from each fall.

How serious the omission of this item is may be seen from the catalogues of all other collections. Thus Paris has 29.8 kilos of the great stone-fall at Pultusk, 1868; but the largest single specimen weighs 2.5 kilos only, that is much less than one-tenth the total weight on hand. At Hessle, Sweden (fall of January 1, 1869), 23 kilos of meteoric stones were gathered; but the largest single stone weighed one kilogramme only. Of the fall at Orgueil, France (May 14, 1864) about 12 kilos were obtained, of which 9.3 are in the Museum at Paris, the largest single stone of which weighs only 2 kilogrammes.

THE BIG METEORIC STONES OF THE WORLD.

The total number of meteoric stones known to me, exceeding 9 kilos in weight, is 25, of which 3 fell at Amana. Of the 22 for the entire world outside of Amana, one half or 11 fell before and one half or 11 fell or were found after Amana. Five of these latter meteorites have not been seen to fall, but have been found and recognized as meteoric stones after 1875.

We may express these remarkable relations perhaps more forcibly by stating that before the three big Amana meteorites were found, only *eleven* big meteoric stones were known, and since that time (that is, during the last thirty years) only six big meteorites have been seen to fall. One of these six is our "White Crust" of 1892.

Or again: at Amana fell one-fourth as many big meteoric stones as had found their way into the collections of the world during the entire century preceding: and during the third of a century since the big Amana meteorites fell, the entire world has only furnished double that number of big meteoric stones, one of which is our "*White Crust.*" *

Finally, we remember that the total weight of Amana meteorites collected and examined by me is 204 kilogrammes which is two-thirds of the biggest single meteoric stone in the world — that of Knyahinya, Hungary, 1866.

We have tried to present these relations of our Amana meteorites to the totality of *big meteoric stones* in the world in a clear and striking manner to the eye by the table printed on page 83 giving all the data at hand for big meteoric stones.

It is therefore apparent, that the THREE BIG METEORITES OF AMANA, Nos. 21, 22, 33 deserve special consideration. In fact, they have already made quite a history which we shall now proceed to give. We shall consider them in the order of their weight — which will also be the order of the interest of their individual history, part of which has been given on preceding pages of this book, see p. 73 to 75.

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* See Comptes Rendus, T. 118, p. 1413; 1894.

THE LARGEST SINGLE METEORIC STONES
WEIGHING OVER 9 KILOGRAMMES.

Before Amana.	AMANA.	*After Amana.*
9.1 Ensisheim, 1492; P.		9.3 Long Island; WC.
9.5 Pultusk, 1868; WC.		
	9.5 AMANA, No. 21; *Hinrichs.* 1875.	
9.9 Mezö-Madaras, 1852; V.		
12.7 Vouillé, 1831; P.		12.0 Gilgoin; WC.
13.5 New Concord, 1860; B.		
15.0 Kernouve, 1869; P.		18.1 Indarch. 1891; WC.
	21.1 AMANA, No. 22; *Amana Society.* 1875.	
	Hinrichs: 24 "White Crust," 1892.	
	27.5 Tieschitz, 1878; V.	
	30 Forest City, 1890.	
	30 Allegan, 1899; W.	
	33.6 AMANA, No. 33: *Amana Society*, 1875.	
42.0 Juvinas, 1821; P.		36.0 Forest City, 1890.
46.6 New Concord, 1860.*		40.2 MacKinney, V.
46.9 Lancé, 1872; V.		46.8 MacKinney, WC.
54.8 Ensisheim, 1492.†		72.9 Baratta WC.
	204.1 AMANA, 1875; *total collected by* HINRICHS.	
293.5 Knyahinya, 1866; V.		

The Collections are designated as follows: B, Berlin. P, Paris. V, Vienna. W, Washington. WC, Ward-Coonley. London could not be used, the weight of largest specimen not being given.

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* Marietta College, Ohio.

† City Hall at Ensisheim; formerly in the church.

Where no year given, fall not known; found after 1875.

Amana Meteorite, No. 21; 9.5 kilos.

HINRICHS.

This magnificent meteorite is the smallest of the three big Amana stones, but it is in every respect the most perfect specimen. See the left large stone, page 19.

It is markedly rhombic in outline, the diagonals being 29 and 18 centimeters (11½ and 7 inches). It is roughly tabular, about 13 centimeters (5 inches) thick.

The cross-face to the right and top shows, especially in its upper part, a later fracture, quite angular as if torn off in two gashes; this surface has a black crust, but very small pittings. The front shows some rather large pittings or finger marks, and here in the lower left part in a few points the crust is slightly damaged — probably from the fall.

I cannot enter upon a full description, which would also require a larger and better figure; the photographer excellently focused No. 22, but the upper part of our No. 21 was decidedly out of focus. See p. 19.

What in this position is the back surface has a heavy black crust and remains almost plane. This taken in connection with the peculiar fracture (top, right) demonstrates that this specimen is the one part of a stone at least double the weight, bursting high up in an atmosphere while its velocity was still planetary.

For the final course the lower-left side has constituted the breast or front of the stone.

On the day when I secured this one stone, I did not obtain any others, but felt perfectly satisfied with the result of my day's work.

Since the next larger stone, No. 22, has unfortunately been reduced by fully one-third, our No. 21 has greatly appreciated in value.

Amana Meteorite, No. 22; 21.1 kilos.

AMANA SOCIETY.

This splendid meteorite is finely represented on page 19; it was well focused, and even this halftone shows much detail, if properly held (looking towards the left, with light incident from the right) while a reading glass is used.

The general outline is again markedly rhombic. The diagonals are 40 and 25 centimeters (16 and 10 inches), while the thickness is 30 centimeters (about 12 inches). The crust is complete, but partly brown, indicating a later fracture.

This stone, together with the biggest (No. 33) was in my custody from July 21, 1875, until July, 1891, as will be more fully shown in connection with No. 33. During these 16 years the stone remained unchanged in my care; it was in no way injured.

Shortly after its return to its owners, the Amana Society, this rare specimen was unfortunately permitted to be very seriously damaged. Any one familiar with meteorites and their value will understand the case, which I will state in its final result in as mild a manner as possible.

The Amana Society have about two-thirds of the stone, in a case of mohogany with three sides of plate glass. These "remains" of the splendid specimens are attached to a knob that can be turned from below — so that the "remains" may be seen th side, of mahogany, being opaque. The the 16 pounds that disappeared in "the Maskelyne would have said) is ground mains, in their elegant coffin, are "*de-ociety*" in the Museum of the State Uni- nformation the label reveals, upon rather lerstand that the dealer was aided by an n to make the society comprehend that econd best Amana Meteorite would be

trace of the one-third of this most val- in the catalogues of some collections in s where "slabs" are described that can the destruction of this most valuable bs are worth much money.

of such rare specimens will join me in hat this fine stone has been so greatly from a "dealer's" standpoint, I ought act has greatly enhanced the value of mana meteorites, No. 21.

OFFICE OF
DR. C. J. WINZENRIED.

Amana Society,

Amana, Iowa Co., Iowa, July 4 1891

Prof. Gustavus Hinrichs

Dear Doctor

The meteorites safely arrived here to day; we hereby acknowledge receipt of same.

Our thanks to you!

Very truly yours

C J Winzenried

The author asks Dr. Winzenried's pardon for inserting this official letter of receipt (for Stones Nos. 23 and 8 which he knows is utterly uncalled for as security against the Amana Society, but constitutes his only possib defense against statements published by the Reptile Press of a lavishly subsidized State University. Compare p. and foot note.

Amana Meteorite, No. 33; 33.6 kilos.

AMANA SOCIETY, 33.15 kilos.

Hinrichs, 0.45 kilos.

This grand meteorite is exceedingly well represented on our page 18, in one-fifth its natural size. Resting on two cubic decimeter blocks which, together with the links of the decimeter rule in the foreground show that the *actual reduction* in this halftone is $\frac{18}{100}$; hence measures taken of the dimensions on p. 18 must be multiplied by 5.6 to get the true dimensions.

The general form is a flat ellipsoid, about forty centimeters in diameter and about twenty centimeters in thickness (about 16 by 8 inches). The thickness I cannot now verify, but take from my publication in the *Popular Science Monthly* for September, 1875.

The crust is black, the markings and special features of form are well shown in the picture. For our small piece at the upper right corner we refer to p. 50.

This is one of the largest meteoric stones in the world. During the half century preceding, only the three stones of Juvinas 1821, New Concord 1860 and Lancé 1872 exceed this Amana Meteorite in weight — not counting the entirely unique Knyahinya of 1866, the largest meteoric stone ever obtained.

During the thirty years since the Amana stones fell, only one stone slightly heavier has been seen to fall, namely the largest stone of Forest City, 1890. The other large stones given on p. 83 have not been seen to fall, but have been found since 1875 and therefore cannot enter into competition.

This splendid scientific specimen deserves a better place than has been given to it. While it is not only just and proper but really advisable that the *ownership* should remain in the Amana Society, its *place of deposit* should not remain in the small college town where it is shown very indifferently in close proximity to a lot of bones and stuffed animals. A properly managed museum in a populous city would take it on deposit and give it a place of honor and show it off in surroundings appropriate to its high scientific dignity, and thousands of visitors and students would

be benefited where now a few persons hardly ever look at it, and where the custodian does not appreciate its value.

The Amana Society, if leaving the "remains" of their smaller stone in its elegant mahogany "coffin" so liberally donated by the dealer at the present place of "deposit," would favor that place more highly than it has merited. This is already indicated in the history of that specimen above given, but will be understood more fully by the history of the biggest stone now under consideration. Compare p. 58, upper part.

The following I clip from my paper on these Meteorites in the "*Chaperone*" of St. Louis for September, 1891:—

"The largest specimen has quite a history of its own since it joined this earth. It was first 'discovered' by a man, not a member of the Amana Society; he carried it home and thought he had found the best possible weight for his 'kraut-barrel.' Just think of it, reader; a celestial visitor, degraded to its avoirdupois only, and serving to keep down the low fermentation in a barrel of sauer kraut! The Amana Society, learning that this magnificent specimen had been taken from their lands, forcibly liberated this celestial visitor from its state of degradation, and brought it back to their chief station, Amana. They kindly intrusted this specimen to my care and I removed it to my laboratory for study.

"In the meanwhile the * * * traders made the 'discoverer' bring suit in court to recover the weight for his kraut-barrel. The replevin proceedings failed to bring the celestial visitor to light; it was as if, in disgust, it had returned to its heavenly abode, without, however, this time, attracting public attention by fire or thunder.

"The suit progressed, experiencing all the beauties of American law. Some rich expert testimony was given, according to which this whilom kraut weight was worth a cool million of dollars. The pleadings were all that could be expected. The defendants argued that the heavenly visitor was as much a natural accretion to their lands, as rain or hail, or as much as 'boulders' which had drifted to their land ages ago; that this stone in question, 'coming with great dignity in a chariot of fire' was no less part

of their land on that account, than if it had been dragged there on an ice floe before man had developed any taste for sauer kraut.

"The court decided — in June, 1877, that this meteorite belonged to the owners of the land, the Amana Society. A couple of years later, the long missing specimen somehow made its reappearance in my house, where it remained in trust till called for by its rightful owners."

I will only add, that the lawsuit was begun September 4, 1876, by serving the Original Notice printed on page 15, "for the delivery of the stone (our No. 33) or *the value thereof* if the same cannot be found," and for "damages." The case came up for trial on a demurrer, on February 1, 1877, and for final trial, June, 1877.

The court's decision was based upon the reasons above indicated, which I had given to our lawyers; this decision of giving ownership of meteorites to the proprietor of the land was followed in the case about the Estherville Meteorite* of 1879 in Iowa, and seems to have become part of American law.

The expert testimony in this case was mainly given by the local astronomer above referred to (p. 74) whose influence was considerable in the State University. As I had taken good care to keep faith with the Amana Society who had intrusted the great Meteorite to me, the Sheriff was unable to find the stone and

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* Of this meteorite I gave the first scientific publication (Comptes Rendus, T. 88, p. 1219; 1879) and made the first scientific examination on the ground, or rather near the musk-rat pond in which the great specimens were hid (from a replevin), secured by a heavy chain. When I found that the great museums of London, Vienna and Paris were expected to buy it in common, I stopped work on this case in disgust.

The large iron-stone weighed 437 lbs., or 191 kilos, of which London retained 116.9, Paris obtained 50.5 and Vienna got 23.2. The smaller meteorite of 60.5 kilos was secured by the Minnesota State University; the Iowa institution, that had bought the remnants of Amana, did not want to invest.

My own specimen of Estherville was bought from Ward's Establishment in Rochester, N. Y. I was the first scientist to handle these 250 kilos of meteorites.

hence we, *the defendants, were liable for its value;* and this value was made out to be equal to *its weight in gold*, twenty thousand dollars at the lowest.

What here can only be read between the lines was a very serious personal risk to me; for over two years the stone for which I was personally responsible to the Amana Society was not and could not be in my personal control, but was an object aimed at by influential local, State and outside parties, as has been indicated before; it will be remembered it had been offered to Vienna, p. 74. I was naturally greatly relieved when that celestial messenger one day again had taken shelter under my roof,* which was only a stone-throw from the North Hall State University building, the entire first story of which constituted my lecture and work rooms, where, for many years, my light was the last seen in town late every night.

LANTERN SLIDES OF AMANA METEORITES.

In this building was the physical and chemical apparatus of the University, which was charged up to me personally on lists signed by me. I had also a very large amount of personal property in this building, which I used for the benefit of the students; I will here mention only a *series of admirable* LANTERN SLIDES *on the Amana meteorites and meteorites in general.* These I had repeatedly thrown on the screen for the benefit of classes and at public lectures in the University as well as during lectures in other States.

Without entering upon a field covered by my addresses to several legislatures of Iowa and which compelled great reforms and a so-called legislative investigation, I shall here repeat from these papers only *a few facts about the above meteorite lantern slides*, to characterize the educational atmosphere under which I have labored and suffered in Darkest America, where by vote of a majority and for a stated sum of money (mulct) that which the State law stamps a crime is now openly practiced throughout the State.

* See cuts on back cover.

The incoming *President-Regent* of 1878 was one of the worst ever seen, and is, I think, mildly characterized by President E. J. James in his inaugural address at the Northwestern University of Chicago, October 21, 1902, published in *Science*, Vol. 16, p. 634 of that year. I quote: —

"More than one foreign critic * * * has defined the government of Russia to be a *despotism tempered by assassination*. Somebody else has remarked that *this is almost an exact description of the government of an American College or University*. * * * The president * * * can drive out not only any particular professor but an entire faculty * * * such an occurrence is not unknown in our educational history. The president keeps on in his course, reformation or *deformation* as the case may be, until the rising tide of opposition finally overwhelms him — and a new experiment is made with another man."

In one regard this representation is unfair to Russia; for in Russia the intelligent classes do remonstrate, while in America such a thing is impossible, *when the administration of a public educational institution is made non-partisan*, as it was in the University of Iowa; for in that case both political parties keep each their own party press in line, and the intelligent people never learns much about what is going on in such State Institutions — or Government Departments.*

On April 7, 1885, I turned over to that president of the Iowa University physical apparatus specified by him by number from the list signed by me — by filling four large cases 8 by 8 feet face and giving him the key. He refused† to sign a receipt for this, but kept my general list holding me responsible, even for that now in his own hand.

On April 29 that president informed me, by letter, that a specified number of pieces in the list of apparatus requested by him

* For example, the Agricultural Department now being investigated about Crop-Reports, "leakages," "tampered records," etc.

† Contrast the receipt of Amana Society, p. 86, which they even accompanied by the original receipt I had given them! Of course, the Amana people are honest men.

from me, and which I claimed to have delivered to him, *had not been so delivered;* he demanded them now of me a second time.

One of my colleagues dared to go, at my request, to the cases and through the glass-doors recognized the apparatus demanded, and so informed that president; of course, this professor's head soon after fell into the basket.

Among the many pieces thus demanded — imputing fraud on me since I had claimed to have returned all goods specified — were such things as "Marey's Drums" and the like, then comparatively new contrivances, not known to the aforesaid local astronomer and meteorite dealer who demanded these things through the president; he probably expected a Marey's Drum to look like a snare drum.

The attempt to convict me of failure to comply with order to return specified apparatus in my custody, and for which I even after its delivery remained liable to the institution holding my receipt for the same, was repeated once more within a month, with one most marked difference. That president, together with the dominant Regent and the aforesaid local astronomer, broke forcibly into the room in which the apparatus and my own property was stored, without giving me notice to let them in or at least to be present while they broke in, and helped themselves to what they pleased to take. I learned of this soon after, and later on, being through friendly influence enabled to see *the official report to the Regents of that local astronomer and meteorite dealer*, I was amazed to read his declaration, that the two highest officers of a State University in America, led by this professor, forced their way into my room *with the declared purpose to take possession of and take away with them for their own use that very set of*

LANTERN-SLIDES OF AMANA METEORITES

which I had devised and paid for, and for which I had, with infinite trouble and at great personal expense, collected the most valuable scientific material, namely THE AMANA METEORITES.

To me this action of the three highest officers of the University of Iowa at Iowa City, has always appeared one of the most criminal burglaries ever heard of. That these highest officers of the State University of Iowa did not carry away with them this my scientific property is not due to any lack of diligence, energy or determination on their part; but simply the fate of the burglar who works a safe from which the treasure he positively knew to have been there — had been removed by its owner.

The general disturbance they had made in my things (what they carried with them I do not know) startled me and made me inquire what had happened; and I did find out the facts as stated.

The next session of the legislature of Iowa, opening early in January, 1886, was memorable. That Regent-President was decapitated by an almost unanimously passed enactment removing the University President permanently from (ex-officio) membership of the Board of Regents. That president, now outside of the Board of Regents, was in the fall of the same year advised to notice that his health was failing; * his "accelerated resignation" came forth early in 1887 and took effect at the close of that school year, June, 1887.

As to the local astronomer and dealer in meteorites, he was "bunched" with two other professors and the bunch dismissed at the same June meeting, 1887; for that Board had been assured (or, if it sounds better, had become convinced) that with this "bunch" remaining, no money appropriation could be expected, and money is now the soul of such institutions.

Curiously enough, the Board made a permanent record of the true cause of this dismissal. They first voted down three separate motions, each motion naming *one* of these three professors for dismissal; a good majority is recorded against the dismissal of these three professors separately and individually. Then the same Board adopts the motion of dismissal of these identical three professors collectively or "in a bunch," as the phrase was at the time.

The *result* did not astonish any one familiar with the legislative

* He enjoyed good health then and since till now.

session of 1886, and the action taken had been agreed upon as was known to me and others; but the Regents, for once, were careful to have their records stand as a demonstration of the reason why this action was taken.

However, neither this nor any other action taken makes in any manner any amends for the wrongs inflicted upon me, who had been persecuted for faithful services rendered during fully a quarter of a century to that institution in its formative period while it was financially poor.*

The one great crime of burglary committed in that North Hall, while disregarded by the State of Iowa, has evidently not been overlooked by a higher power. In the early morning hours of June 19, 1897, a flash of lightning struck that building and set it on fire, which largely destroyed the library † in the upper story and greatly damaged the apparatus below.

The only recognition I have received is the following expression of the Legislative Committee of Investigation, which investigation was mainly forced by my friends in the 22nd General Assembly:—

> "* * * Professor Hinrichs has given to the University the best years of his life, and has probably contributed more than any other one man to its upbuilding. His recognized ability and eminence in his profession have been a tower of strength to the scientific departments of the institution.
>
> * * *
>
> "During the entire time of our investigation we have been thrown into constant intercourse with Prof. Hinrichs, and * * * we have invariably found him obliging, courteous, kindly, and in the most trying circumstances a perfect gentleman."

* The permanent endowment, started in 1878, by the sum of 20,000 dollars a year, was carried very largely through my influence.

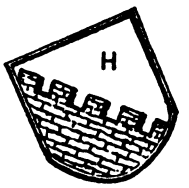
† This contained many of my books, which I had given to the Laboratory to build up a special library for use of advanced students, which I had made to work in form of a society (Franklin Scientific). The president had these books removed to the general library. Now they have such department libraries at public expense.

My fine lantern slides I expect soon to use again in order to project on the white screen the most vivid and exact picture of the beautiful and almost complete collection I succeeded in bringing together of the

AMANA METEORITES.

The "*Celestial Messengers*" so finely represented by these lantern slides — of which the very good halftones in this book are but like a shadow — are the best now remaining with me after the meteorites themselves are scattered, largely by my own hand, throughout the scientific world. It would seem as if the last chord of the history just given is a tone of regret for time and labor freely given, and vexation and persecution endured.

But if it shall be admitted that the Amana Meteorites have been more completely collected and better distributed throughout the world for the permanent benefit of science than any other similar meteorite fall, I can see no reason for regrets, but shall feel happy that even to a limited extent my intentions have been realized.



POSTSCRIPT AND PROSPECTUS.

This little work on the Amana Meteorites is published in commemoration of the thirtieth anniversary of that most notable fall of meteorites. While I succeeded in getting out the first form (16 pages) of illustrations on the very date of that event, February 12, it has been impossible to get out the text till now, the beginning of August. The form of illustrations was very kindly received.

As a further and important commemoration, two of my special notes on these meteorites, particularly on their density, were presented by Berthelot to the Academy of Sciences of Paris in the very month of February, practically thirty years since the fall of these meteorites. It may seem strange, but it is a fact, that the densities were only recently calculated from the weighings made in 1875.

THE METEOR CONSISTED OF ONE STONE.

The second of these Notes on the Density of the Amana Meteorites* establishes the fact, that the specific gravity of these meteorites is almost constant, precisely as if they all were fragments of the same rock in the same layer of the same quarry. This investigation is based upon the determination of the specific gravity of 40 complete meteoric stones and 12 larger fragments, in all 52 meteorites, the total weight of which is 54 kilogrammes; the average weight is 1.03 kilos, while the individual weights ranged from 5.4 to 0.06 kilos.

I dare say that no research on meteorites has ever been made comparable to this in the magnitude of the material used or in the importance of the result established. This result is also stated by saying that the iron in these meteorite masses is quite uniformly disseminated in the same, not varying as much as half a per cent, when the large meteorites here made use of are concerned. At the same time I state as my results on small fragments, such

* Comptes Rendus, Tome 140, p. 612–614, 1905. Presented at the Meeting of February 27, 1905.

as have hitherto commonly been employed, that the percentage of iron present ranges from 5 to 30, and that I have nice, but small, fragments which may even be considered as syssideres, that is stones containing the iron in a continuous, coherent mass.

Accordingly we conclude that the meteor on striking our atmosphere was a single, discoid mass which broke into the meteorites found during its flight through our atmosphere.

A very careful study of the stones at quite an early stage of my work suggested this result, to which I hope to return more fully in a near future. Here it may suffice to call attention to the lower cut on page 1.

MAGNITUDE AND FREQUENCY.

My researches on the relation of *Magnitude* to *Frequency* of Meteorites, were begun with the study of the Amana Meteorites in 1875, brought to a close in 1894 covering all large collections of which catalogues were then at hand, and have been, during the preceding summer, extended to all collections and all meteoric stone-falls of which I have been able to obtain the necessary data. All drawings required have been made, plainly representing the remarkably simple mathematical laws recognized. See also pp. 27–28 above. These really interesting general results we hope to publish, at least in outline, very soon.

ORIGIN OF METEORITES.

Our researches into the origin of Meteorites have been merely referred to in the closing pages of the paper "On the great Iowa Meteor" in the September number of the *Popular Science Monthly* for 1875. These researches are dependent upon our publications on the inter-planetary medium (Am. Jrl. Sc. 1864 and 1865). At that time but few, like Father Secchi, were willing to admit the medium; now everybody admits it.

By remarkable peculiarities of some of the numerous asteroids discovered during the last quarter century, these apparently distant links have been closely connected, as we hope to publish as soon as the necessary leisure may be obtained. The main work done on this topic was completed four years ago.

OUR OWN COLLECTION.

We have appended a list of our general meteorite collection, of 73 localities and weighing 4¼ kilogrammes.

To this "GENERAL COLLECTION" must yet be added of

Amana Meteorites	19.4 kilos.
"White Crust" Oldhamite . . .	22.8 "

which give the total of 46.5 kilogrammes.

A private collection comprising 73 Localities and aggregating 46.5 kilogrammes surpasses a good many public Collections of Meteorites which are by Wülfing* ranged among the more notable collections — though Wülfing had not discovered any part of my collection. Thus the collections at Cambridge and Oxford, England; at Odessa, Russia; at the universities of Munich, Christiania and Upsala are both in number of localities and in total weight decidedly below my collection.

The collection of meteorites at the Mining School of Paris, the University of Rome, the Museum of Klausenburg, Transsylvania and the Bohemian Museum at Prague, are about equal to mine in number of localities but generally below mine in weight. The collections of Copenhagen, Dresden, Göttingen and Moskow exceed mine in number of localities, but are very decidedly inferior in weight.

THAT "WHITE CRUST" METEORITE.

But we have in our collection a perfectly unique and big new meteorite,† the "White Crust" of 1892, a single stone weighing

---

* Die Meteoriten in Sammlungen, 1897, pp. 408–429.

† My son, Professor Carl G. Hinrichs (4106 Shenandoah Avenue, St. Louis, Mo.), is now the owner of this most remarkable meteorite, described by me in my paper presented by Daubrée to the Academy of Sciences of Paris, June 18, 1894. See Comptes Rendus, Tome 118, p. 1418; 1894.

When, soon after writing the paper just specified, I received the Catalogues of the Paris Collection for 1882 and of the Vienna Collection for 1885, I naturally changed my mind concerning the disposition of the "*White Crust*" meteorite. Compare p. 64–65 above.

23 kilogrammes (the fragments specified fit into same). It is a dark stone, resembling that of Tadjera, almost completely coated with white Oldhamite (Calcium Sulphide); by this one specimen our collection is vastly enhanced above all the public collections to which we just have compared the same.

OUR FOUR NEW METEORITES.

In conclusion I may be permitted to enumerate the new localities I have been the first to investigate and to publish: —

Amana, 1875,	weight	204 kilos,
Estherville, 1879,	"	250 "
White Crust, 1892,	"	23 "
Marengo, 1894,	"	*
Total: 4 Localities,		477 kilos,

which is about one-half of a ton.

Of this, one-half was snatched away by the three great museums of Europe combining to obtain Estherville (see p. 89); and of my personal share of Amana I donated to public collections fully two-thirds of all I possessed. Yet it seems to me that I still have a collection of meteorites worthy of mention.

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* Collected less than 20 grammes, but amount fallen actually very considerable. See lower map, p. 9, also text, p. 71.

CORRECTIONS ON PLATES:

p. 21. The label number on tetrahedral stone, right hand, top, should read 53 instead of 52, which is the left hand top stone.

p. 8. Stone No. 32 in Sect. 30, T. 81, R. IX should be removed; is properly located in Sect. 16, T. 80, R. IX. Correction made in Text, p. 52, first line of table.

GENERAL COLLECTION OF METEORITES OF DR. GUSTAVUS D. HINRICHS.

No.	Locality.	Fell.	Weight.†
	METEORIC STONES.		
1	Ensisheim, Alsace, Germany	1492, Nov. 16	5
2	Wold Cottage, Thwing, Yorkshire, England	1795, Dec. 13	27
3	L'Aigle, Orne, France	1803, Apr. 26	18
4	Weston, Fairfield Co., Connecticut, U. S.	1807, Dec. 14	4
5	Stannern, Moravia, Austria	1808, May 22	2
6	Durula, NW. of Kurnal, Punjaub, India	1815, Feb. 18	38
7	Juvinas, Ardèche, France	1821, June 15	3
8	Futtepur, NW. Provinces, India	1822, Nov. 30	50
9	Honolulu, Hawai, Sandwich Isids.	1825, Sept. 27	1
10	Aldsworth, Gloucestershire, England	1835, Aug. 4	12
11	Utrecht (Blaauw-Kapel), Holland	1843, June 2	81
12	Hartford, Linn Co., Iowa, U. S.	1847, Feb. 25	20
13	Kesen, Prov. Hondo, Japan	1850, June 13	16
14	Yatoor (or Nellore), Madras, India	1852, Jan'y 23	60
15	Baratta, New South Wales, Australia	1852, ?	28
16	Montréjeau. Haute Garonne, France	1858, Dec. 9	8
17	Butsura, Goruckpur, NW. India	1861, May 12	65
18	Orgueil, Tarne et Garonne, France	1864, May 14	10
19	Aumale (Senhadja), Algiers	1865, Aug. 25	18
20	Udipi, S. Canara, Malabar Coast	1866, Apr. ?	40
21	St. Mesmin, near Troyes, de l'Aube, France	1866, May 30	25
22	Knyahinya, Unghvar, Hungary	1866, June 9	45
23	Tadjera, Setif, Algiers, N. Africa	1867, June 9	19
24	Pultusk, Poland, Russia	1868, Jan'y 30	196
25	Daniels Kuil, Griqua, S. Africa	1868, Mch. 20	24
26	Ornans, Doubs, France	1868, July 11	17
27	Hessle, near Upsala, Sweden	1869, Jan'y 1	54
28	MacKinney, Collin Co., Texas, U. S.	1870, ?	141
29	Waconda, Mitchell Co., Kansas, U. S.	1873, ?	20
30	Amana, Iowa Co., Iowa, U. S.	1875, Feb. 12	1016
31	Mocs, Kolos Comitat, Transylvania, Austria	1882, Feb. 3	10
32	Alfianello, Brescia, Italy	1883, Feb. 16	38
33	Tysnes, Bergen, Norway	1884, May 20	5
34	Tabory, Perm, Russia	1887, Aug. 30	47
35	Ergheo, Somali, East Africa	1889, July ?	3
36	Gilgoin, Brewarrina, New S. Wales	1889, ?	12
37	Jelica, Cacak, Servia, Austria	1889, Dec. 1	*
38	Forest City, Winnebago Co., Iowa, U. S.	1890, May 2	495
39	Farmington, Washington Co., Kansas, U. S.	1890, June 25	67

* Microscope Slide.

† Weight in gr...

40	Long Island, Phillips Co., Kansas, U. S.	1891, ?	24
41	"White Crust" of Hinrichs,* U. S.	1892, Nov. 2	214
42	Marengo, Iowa Co., Iowa, U. S.	1894, Mch. 27	5
43	Kansada, Ness Co., Kansas, U. S.	1897, ?	21
44	Zavid, Zwornik, Bosnia, Austria	1897, Aug. 1	11
45	Saline, Sheridan Co., Kansas, U. S.	1898, Nov. 15	18
46	Bjurböle, Borga, Finland, Russia	1899, Mch. 12	38
47	Shelburne, Grey Co., Ontario, Canada	1904, Aug. 13	12
	STONY IRONS.	Found.	
48	Bitburg, near Treves, Rhen. Pr., Germany	1802	6
49	Imilac, Atacama, Chili	1822	128
50	Steinbach, Rittersgrün, Saxony, Germany	1861	64
51	Mejillones, Atacama, Chili	1874	43
52	Estherville, Emmet Co., Iowa, U. S.	fell 1879, May 10	19
53	Crab Orchard, Cumberland Co., Tenn., U. S.	1887	18
54	Brenham, Kiowa Co., Kansas, U. S.	1890	31
	METEORIC IRONS.	Found.	
55	Descubridora, San Luis Potosi, Mexico	1780	14
56	Toluca, State of Mexico, Mexico	1784	81
57	Cape of Good Hope, Cape Colony, S. Africa	1793	44
58	Misteca, Oaxaca, Mexico	1804	17
59	Charcas, San Luis Potosi, Mexico	1814	10
60	La Caille, Alpes Maritimes, France	1828	52
61	Coahuila, State of Coahuila, Mexico	1837	22
62	Magura, Arva District, Hungary	1844	3
63	Cranbourne, Mornington Co., Victoria, Austrl.	1854	17
64	Orange River, Southwest Africa	1856	18
65	Trenton, NW. of Milwaukee, Wisconsin, U. S.	1858	33
66	Staunton, Augusta Co., Virginia, U. S.	1858	55
67	Obernkirchen, Westphalia, Germany	1864	61
68	Ovifak, Disco Bay, Greenland (natif Fe)	1870	811
69	Tombigbee, Choctaw Co., Alabama, U. S.	1886	101
70	Mount Joy, Adams Co., Pensylvania, U. S.	1887	18
71	Augustinowka, Ekaterinoslaw, Russia	1890	15
72	Cañon Diablo, Coconino Co., Arizona, U. S.	1891	64
73	Sacramento Mts., Lincoln Co., New Mexico, U.S.	1896	180

Summary.

		Weight. Total.	Mean.
46	Meteoric Stones†	2428	53
7	Stony Irons	309	44
18	Meteoric Irons‡	705	39
71	Sum	3442	48
	Ovifak	811	
		4253	

* Comptes Rendus, T. 118, p. 1418; 1894.
† The microsc. slide, not counted in mean.
‡ The terrestrial iron Ovifak not counted.

CONTENTS.

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